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ABSTRACT

This book deals with methods for planning national parks to enable them to provide the greatest benefit to human activity. Chapters included are: (1) "A Conceptual Framework for the Management of Wildland Resources"; (2) "The Growth and Development of National Parks in Latin America"; (3) "Planning National Parks for Ecodevelopment in Latin America"; (4) "The Evolution of National Park Planning in Latin America"; (5) "A Practical Method for Park Planning"; (6) "A Practical Method for Planning National Park Systems"; (7) "The Formulation of a Strategy Plan"; (8) "Human and Institutional Capacity to Manage National Parks"; (9) "Some Guidelines from Park Management Experience in Africa"; (10) "Major Problems Facing National Park Management in Latin America"; (11) "International Cooperation and Assistance in National Park Management"; and (12) "Strategy for Regional and Global Cooperation." Appendices are inserted in each chapter, and a 22-page index has been supplied. (YP)

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Planning National Parks for Ecodevelopment

Methods and Cases from Latin America

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PLANNING NATIONAL PARKS FOR ECODEVELOPMENT

Methods and Cases from Latin America

Volumes I & II

Written by:

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March 1989

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PLANNING NATIONAL PARKS FOR ECODEVELOPMENT

-- Methods and Cases from Latin America --

VOLUME I

by

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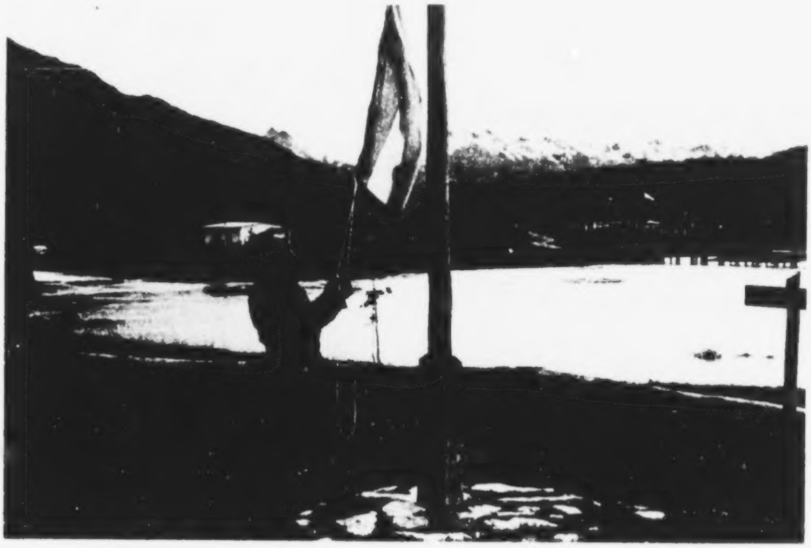
**Fundación para la Ecologia y para la Protección
del Medio Ambiente
Madrid, Spain**

Dedication...

to the park managers and rangers who carry the custodianship of their nation's natural and cultural heritage, to manage them for the benefit of present and future generations...



A ranger in Tierra del Fuego National Park, Argentina.

PREFACE

This is a book about national parks. It deals with methods for planning national parks to enable them to provide the greatest possible benefit to mankind. And, it focuses upon Latin America where nations are forging ahead with development programs which include the search for means to provide adequate stewardship for natural and cultural heritage and for the maintenance of the biosphere.

The book has been written to provide a text for park managers, rangers, and students of middle- and university-level curricula in the field of natural parks, wildlife or wildland management. No other book exists in the Spanish language for practitioners in this field, and no book exists in any language which develops and integrates the theory and the practice of wildland and park management. The book is also written to share my experiences and those of the countries of Latin America with others in that region and elsewhere in the world. While the book concentrates on Latin America, various reviewers of the manuscript commented that the principles and guidelines were in fact of universal interest and applicability.

The subject is important because it relates to man and his most important assets: the natural heritage that gives him the resources with which he has to work to feed and cloth himself, to seek shelter, water, medicines, solace, education, identity and the other necessities of life; and the cultural heritage which shows him what he has done and from whence he is coming, in order to learn from the past and make out a path for the future. Wildlands are rich in both natural and cultural values for man. By their very nature, they are still available for human choice and consideration. The major choice, however, is to face up to the need to plan for the orderly employment of the Earth's remaining wildland resources, and to place them under the appropriate management towards benefits of high priority to mankind.

In this way, the material of the book relates to ecodevelopment -- the way in which man organizes and manages his habitat to provide for his necessities both now and in the future. It integrates consideration of economic, social and ecological factors and accepts politics as a natural and valid aspect of human development.

Much of the book is based upon my personal experience. Following a U.S. education through the Ph.D. degree, I spent some 15 years residing and working in Latin America, the bulk of which was with the Food and Agriculture Organization of the United Nations (FAO). Shorter term activities and field work were realized in Europe, Africa and Asia. Thus, the ideas and suggestions represent a blend of cultural backgrounds and pretend to carry considerable sensitivity to the attitudes and realities of developing countries and the concepts for the "new world economic order."

The book is organized into 12 chapters. Chapter I presents a conceptual framework for the management and development of wildlands. It provides the context for viewing all wildlands and provides alternatives to employ them for ecodevelopment. From this overview, the growth and development of the national park in Latin America is reviewed. The remainder of the book then concentrates upon the national park as the most studied and developed category of wildland management in Latin America and the world.

The fundamental principles for planning national parks are established in Chapter III, and a review of park planning experience in Latin America is presented in Chapter IV.

The treatment of park planning is divided into three chapters: In Chapter V, a method for planning the individual national park is presented in considerable detail. Chapter VI explores the planning of systems of national parks to cover the requirements of entire nations. And, in Chapter VII, a method is suggested for planning the strategic elements of actually implementing the plans for individual parks and national park systems.

In the final analysis, the ability of any country to implement a national park program in any practical way will depend upon whether it can obtain and employ men and women capable of selecting goals, designing plans to meet those goals and then actually implementing the plans to achieve the goals. Chapter VIII focuses upon the development of managerial capacity.

In Chapter IX, a side-step is taken to consider the experience of developing countries in Africa. While the historical and cultural differences between Latin America and Africa appear to be insurmountable, there is much to be learned from several specific cases which can be safely generalized to Latin America.

The problems faced by the directors and managers of national parks in Latin America are many and diverse. Among them are several which relate specifically to developing the capacity to plan and manage national parks. Chapter X presents a series of problems which appear to me to be the most outstanding, and solutions are suggested which the individual park departments can employ according to their own needs and perceptions.

Chapters XI and XII climb to the international level. First, a review is made of the several international agreements, conventions and projects which are currently active or under study. Particular emphasis is given to those institutions and programs which offer considerable promise for benefits to the Latin American nations. Some of these programs embrace activities which can be expected to be of critical importance for international cooperation in ecodevelopment in the near future. Second, the national- and international-level considerations posed in all of the previous chapters are integrated into a strategy for global cooperation.

I have tried to integrate theory and practice. Important emphasis is given to providing a solid conceptual basis for making decisions about the management and development of natural and cultural resources. Then pragmatic solutions are offered. This relationship between the overall perspective, scientific principles and pragmatic applications is complemented with examples from Latin American experience. I believe that there is no substitute for strong theory, fundamentals and principles in order to reduce the risks involved in managing and developing unique and irreplaceable resources, especially where experience is limited. Moreover, I believe in the need for pragmatic solutions which can be applied flexibly to the enormous diversity of circumstances found around the region. The examples attempt to convince the reader that a great deal of work has been done, that the theory, fundamentals and principles are indeed useful, and most humbly, that there remains a great deal of work yet to be done.

Emphasis is placed upon the individual national park. While parks can only meet certain objectives for ecodevelopment, they are a key instrument for conservation action in Latin America and throughout the world. Emphasis is also given to the nation state. It is the key power capable of instrumenting action on conservation management. Plans for park systems, regional cooperation, international conventions and the like are ideals. They are necessary activities and are worth pursuing. They represent steps towards global conservation solidarity relating all humans to their shared environment. But, first and foremost, the basic elements must work: nations, both rich and poor, must develop the capacity to manage natural and cultural resources and must make a realistic commitment to a development which incorporates due considerations for the care and maintenance of the biosphere. And, conservation areas must be organized and managed to achieve objectives for ecodevelopment.

The argument for planning to meet the objectives of ecodevelopment is couched in terms of strategies and tactics for conservation. These terms are generally associated with war, and quite appropriately, they are useful in conservation where indeed a war is on between man and his life-support system. Peace will arise when man quits raping his resources and stops exploiting his fellow man. National parks as instruments for ecodevelopment can contribute in no small way to that end.

In preparing the citation of literature particular difficulty was found in following standard bibliographic techniques. Many references come from sources which are in mimeographed form and have received internal use or limited circulation only. The value of these materials is generally equivalent to most so-called publications, and suffers only from having been produced in places where formal journals are scarce and budgets for publication are often non-existent. I have placed all citations at the end of each related chapter in a format which combines footnotes and literature cited.

The book represents a first try. There is considerable risk of over-simplifying science, over-mechanizing procedures for planning and over-complicating the methods for management. It is hoped that this book can form a preliminary contribution, among others, to the development of a "science of conservation".

The author wishes to give special acknowledgement to the many colleagues who helped create and test the ideas in the book. Particular mention should be made of Jorge Barroso, Mario Boza, Julio Castellanos, Arne Dalfelt, William Deshler, Marc Dourojeanni, Simon Max Franky, John Moseley, Maria Tereza Jorge Padua, Arturo Ponce, Carlos Ponce del Prado, Allen Putney, Pedro Rodriquez, Paul Spangle, Kyran Thelen, Gary Wetterberg, C. William Wendt, and Bernardo Zentilli.

Colleagues in the Food and Agriculture Organization of the United Nations (FAO) at Headquarters in Rome, and at the Regional Office for Latin America in Santiago, Chile, and the United Nations Development Program (UNDP) at Headquarters in New York, were responsible for making much of the field work possible and for providing constant technical and moral support. Particular thanks go to Louis Huguet, Charles Lankester, Thane Riney, Armando Samper, and Jack Westoby. The OAS, and particularly Kirk Rodgers, has been supportive since the early work of the 1960's. Friends at the U.S. National Park Service have always provided information and dialogue, and Fred Packard gave special help in preparing the reference notes to the chapters.

Gerardo Budowski has been a constant source of inspiration, beginning as my first boss at the Center for Research and Training in Tropical Agriculture (CATIE) at Turrialba, Costa Rica, and later from his position at the International Union for the Conservation of Nature and Natural Resources (IUCN) in Switzerland.

The Rockefeller Brothers Fund (RBF), and particularly their officers William S. Moody and John Camp, warrant special mention. In 1970, at a time when other funding institutions were yet unprepared to give attention to these matters, RBF recognized the importance of managing wild natural resources for the objectives associated with rural development. RBF granted FAO one-half million dollars over the next four years to initiate the Wildland Management Program in Latin America which I was privileged to direct.

In 1975, RBF joined with the School of Natural Resources of the University of Michigan to provide me with the opportunity to write this book. The grant also covered additional field work in Latin America as well as in Africa. Without the financial support and constant moral support from RBF and the mentioned officers, much of the field work in Latin America and this book could not have been realized.

The International Union for the Conservation of Nature and Natural Resources (IUCN) and the World Wildlife Fund (WWF) provided me with a supplementary grant which was utilized to cover the costs of reproducing and circulating the manuscript for review and criticism.

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Finally, a special form of gratitude is due to the author's wife and two children for their encouragement and tolerance during weeks and months of absence for field work and the many days shut away at the typewriter. During our decade together in Latin America, we were privileged to be able to share some of the most beautiful and meaningful natural and cultural experiences to be found anywhere.

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CHAPTER I

A CONCEPTUAL FRAMEWORK FOR THE MANAGEMENT OF WILDLAND RESOURCES

Introduction

Economic and social development is a fundamental commitment of the governments of Latin America. A wide variety of styles and methods for development are being followed. The political context within which development is taking place is variable, virtually every nation pursuing a unique path. In common, however, are the roots of Iberian culture mixed to varying degrees with Amerindian, African, Asian and recent European influences. Also in common is the pressure to establish economic and social justice.

Since World War II, development has given emphasis to industrialization, luring people to urban centers with the promise of employment and higher standards of living than in rural areas. Modern agriculture has been introduced and greatly expanded in order to support urban and industrial development. Modern transportation has penetrated areas which were until recently only vast wilderness territories. Raw material, semi-elaborated and elaborated products, and people pass along the expanding networks of roads. Thus, while some people are heading for the city to find their fortune, others are traveling to the interior to seek their future in agriculture, animal husbandry or the new development poles.

The benefits of economic and social development are apparent across the continent. Nutrition, health, sanitation, disease control, education and housing are generally improving, in some areas much more quickly than others.

But the results of development have not always been positive. The fruits of development have not reached all sectors of society. Many segments of the population still experience unacceptable standards of living. The different levels are exaggerated by the widening gap among the various strata of society within many countries. The displacement of people by the remnants of latifundio, development schemes and various forms of disaster forces millions of landless poor into the interior forests, onto areas marginal to agricultural production, high into the Andes.

Other negative effects of current forms of "modernization" and development include the alienation of both urban and rural dwellers from the realities of the human habitat. Urban people have forgotten where their food, water and wood come from. The land-use methods of rural people have crossed ecological thresholds and soils erode, water runs off the surface, and fires burn the scarce organic matter of life. Together, both urban and rural peoples are building societies which only partially achieve sustainable growth and stability. While someone builds a hydroelectric dam downstream, another opens and burns the forest upstream. While one develops a fishery along the mouth of an estuary, another diverts stream waters for irrigation and returns the water laden with pesticides, salts, and sediment.

Economic and social development has also tended to limit its focus to specific problems or sectors. There are plans and programs of action for electric energy, transportation, irrigation and colonization. Where soils permit, there are projects for the development of particular crops or livestock. The more-enlightened development programs have tended to favor investments in the so-called direct human-oriented requirements. But, in virtually all cases little attention has been given to the whole in which the elements merely form parts.

The over-all human habitat has been neglected. The slopes of the Andes are in accelerated erosion, the semi-arid lands are in desertification, the tropical forests are being cleared for unstable pasture, the sediment in rivers is pouring into major engineering works and out across coral reefs. Each country has its examples of flood and drought caused by human activity. Elsewhere there are examples of rivers which have lost their capacity to carry and filter wastes. Smoke and dust from fire and wind remain in the air and are carried hundreds of kilometers. Chemicals from intensive agriculture are becoming residual in soil and water. Species of plants and animals are being lost, and cultures are being erased. Man's activity is overwhelming the biological capacity of the planet.

But, there is no turning back. The thrust of economic and social development is strong. There are factions which prefer to push for development as quickly as possible, leaving the problems of the environment until later. Others argue for caution in the application of technology and development to avoid costly reclamation work or possible irreparable damage to the environment.

The solution is not to be found in a single over-simplified approach. The urgent need for economic and social development somehow has to be tempered with adequate protection of the environment.

For years, and even decades, there have been individuals and professional groups working with that conviction. At the United Nations Conference on the Human Environment in 1972 at Stockholm, it was advocated that conservation principles be incorporated into development. Subsequently, this and related ideas have become more formalized under the term ECODEVELOPMENT which was coined by Mr. Maurice F. Strong, the first Executive Director of the United Nations Environment Programme (UNEP). Ecodevelopment is based upon the concept that ... "Development at regional and local levels, should be consistent with the potentials of the area involved, with attention given to the adequate and rational use of the natural resources, and to the application of technological styles (innovation and assimilation) and organizational forms that respect the natural ecosystems and local socio-cultural patterns."[1]

Fundamentally, the objective of ecodevelopment is to utilize resources to meet human requirements and to improve and maintain the quality of human life for this and future generations.[2] To face this challenge, development must take place in a manner which integrates biological considerations together with economic, social and political factors to address both human welfare and the human environment.

The concepts and principles of ecodevelopment were further clarified by Latin American governments and specialists at their meeting in Cocoyoc, Mexico in 1974.[3] The essential aspects of ecodevelopment and the Cocoyoc Declaration can be synthesized into eight points (See Appendix I-A):[4]

1. The basic unit for development is the ecosystem or geographical region (watershed).

2. Natural resources and humans are to be treated on an integral basis as elements of one total system.

3. Mechanisms must be created which will provide for the active participation of all humans involved in, or to be affected by, the development process.

4. Development should give primary attention to meeting the basic necessities of the human population: food, water, shelter, health, education and the fundamental human rights.

5. Those technologies should be utilized in the development process which incorporate and enhance local culture and experience. Local initiative and self-reliance are to be respected and promoted, and imported technologies are to be screened to insure their adequate adaptation prior to implementation.

6. Human activities should be designed and operated to maintain and enhance the productivity of the biosphere -- the surface layers of Planet Earth where all terrestrial and aquatic ecosystems operate and upon which all life depends.

7. Human activities should also be designed and operated to use wisely (conserve), the energy and materials of Earth and to respect, maintain and enhance the natural processes which produce and recycle energy and materials.

8. And finally, development should respect, maintain and enhance the diversity of natural life and human cultures to maintain and expand the availability of options for this and future generations of humans. This requires that homogenization of land use and human life styles be avoided.

Among the results of Stockholm and Cocoyoc the ball was put into the court of the ecology, forestry, and land management professions and related governmental departments. They are now being called upon to provide the necessary guidance for the integration of conservation into development. Pioneering contributions were made by Dasmann, Milton and Freeman in Economic Guidelines for Economic Development.[5] Ray and Dasman prepared guidelines relating to marine areas[6] and McEachern and Towle worked on island environments.[7] The International Union for Conservation of Nature and Natural Resources (IUCN) together with the World Wildlife Fund (WWF) and several United Nations organizations held a meeting in Caracas, Venezuela in 1974 on "The Use of Ecological Guidelines for Development in the American Humid Tropics." The innovative aspect of these efforts was their focus upon both the development of humans and the human habitat as inseparable elements of the same problem.

The introduction of ecological considerations into development also brought into perspective the interrelationship between rural and urban areas. Rural lands have been "mined" to supply wood products, minerals, and other renewable and non-renewable resources to the urban and industrial centers of Latin America and around the world. They have become the "buffer zone" expected to absorb the landless migratory peoples and those displaced from areas damaged by over-utilization. Urban garbage and sewage, the runoff from industry, and the soil from upstream agriculture and grazing has begun to clog what has been essentially a "free waste disposal system."

National development planning has analyzed and treated those rural lands where soils have high potential for agriculture or pasture and where forest have high timber values. Other rural lands, however, such as the upstream catchments, mountains, swamps, estuaries, interior forests, coral reefs and coastal lands, are classified as "forest reserve" or simply, as unallocated public lands (baldio). These rejected areas cover a large portion of the region and it is there where major choices on land use have yet to made. Within these wildlands are elements of ecological systems which create and maintain soil nutrients, absorb and filter wastes, make streams flow with clean, regular water, and maintain the reservoir of the diverse forms of life on Earth. In these lands are links of chains upon which the security and stability of the human habitat depends. Agriculture, forestry and fisheries production depend upon the ways in which wildlands are put to use.

Also in these wildlands are features which are part of the heritage of all humans. There are the species which have evolved with humans and support them with food crops and medicines. There are ecosystems which regulate the Earth's environment. And there are cultural objects, sites, structures and technologies which tell of the human past and continue to provide guidelines for wise land use based upon thousands of years of the human experience. In these wildlands, humans can study and learn about their own habitat. This heritage belongs to people, in this as well as future generations. Thus, the decisions concerning the use of wildlands carry serious responsibility for those who must choose.

Ecodevelopment, as a newly emerging concept, is beginning to provide the conceptual framework to link all sectors of the economy to one another and to the overall environment. It suggests to those charged with making decisions about the use of land that the limits to which the natural processes of Earth can be pushed must be respected.

Yet lacking is a practical explanation of the relationship between wildland resources and the many diverse requirements of humans. This involves the need to clarify the dependency of humans upon wildlands. Alternative methods for handling wildlands as part of economic and social development need to be explained.

Through appropriate management, wildlands can support development and meet heritage responsibilities. The benefits from wildlands can be produced so as to be available to all levels of citizenry of any nation. Wildlands can be managed to produce a wide range of goods and services to benefit both urban and rural peoples and to provide added employment opportunities. Wildlands can serve to reduce the alienation of man from his environment. And through the permanent custodianship of key areas and resources by technically competent public agencies, development can become more stable and sustainable.

Some large areas must remain in their natural state on a perpetual basis. In that way the natural resources can best serve ecodevelopment. Other areas can be utilized to retain certain natural qualities but yield products from natural resources. Various combinations of land management methods can be suggested to provide for the many needs of man and his habitat. Just as man has great diversity in his social, economic, and political systems, and similarly, as nature has great diversity in her species and ecological systems, so must an array of methods for the management of wildlands be established for the use and care of natural and cultural resources.

Of the many wildland management methods in use around the world and throughout Latin America, the national park has the greatest experience. Over 1,500 areas in over 100 nations have been established as national parks. In Latin America, some 18.5 million ha are being managed as national parks for a variety of reasons. However, national parks, like agriculture, cattle ranching and human settlements, have generally been set up with little planning. Each activity has been done in isolation, one from another. Even in the selection of areas to be managed as national parks, the underlying principles of ecological systems and interdependencies have not always been followed. In many cases, parks were established prior to the availability of ecological principles and guidelines. As such, many parks have not yielded the benefits which were expected from them.

Furthermore, national parks have only incidently involved some form of active participation of representatives of the many sectors of society. The linkages between park management and the basic necessities of human life are unclear and little known. While many educational activities have been implemented to interest park visitors in natural or cultural history, little effort has gone into relating the visitor to the role of national parks in human environment and human welfare.

National planning has become a regular tool throughout Latin America to correct the deficiencies caused by a lack of coordination among sectors, to harmonize the conflicts between interests, to ensure a more balanced sharing of welfare throughout the society and to consider the potential environmental consequences of each development activity prior to project implementation. Similarly, planning can provide a mechanism to organize and focus national parks and other wildland management methods towards ecodevelopment objectives.

This Chapter presents a conceptual framework for the management and use of wildland resources as ingredients of overall development. The original ideas were developed with colleagues of the FAO Regional Project on Wildland Management for Environmental Conservation, a program in Latin America supported by the United Nations Development Program and the Rockefeller Brothers Fund. Some of the concepts have been published in earlier versions.[8]

The framework has its roots in forestry dating back five centuries in central Europe. It includes lessons learned from the conservation movement in the early twentieth century in North America, and has been further developed within the Latin American region during a decade of work by the author and many associated individuals from throughout the hemisphere. It represents the integration of principles from the natural, social and management sciences. Academic terms and complexities have been submerged for the sake of simplicity (at the risk of some over-simplification). Basically, it states that: All elements of natural and cultural resources in wildlands are to be mobilized for the benefit of all members of the human population. Some wildlands can be converted into commercial uses. But other sectors of wildland cannot or should not be converted form wild state because of ecological cycles and chains which bind them to the security and stability of all other forms of production, and because of unique features which are of value to human heritage.

Two aspects of the conceptual framework require considerably more work and elaboration. Cultural resources are included wherever objects, sites or structures are found in wildland. There is room to expand the framework to incorporate cultural landscapes and integral sites.[9]

Furthermore, the conservation and management of marine resources is just now receiving serious attention as this book goes to press.[10] The conceptual framework will have to evolve to contemplate highly mobile marine species, dynamic marine systems which do not maintain permanent location, and the management and regulation of very large ecosystems under various forms of ownership and utilization.

The conceptual framework is presented to orient the professional and student of natural resources management to the context within which national parks will be treated in subsequent chapters. Several factors are critical: Humans will try to develop with or without conservation. Unless conservation can involve land use methods which relate to humans and their habitat in ways which can be explained and understood, wildlands will be altered and impoverished with negative results for all. Wildland resources are not only capable of yielding valuable support to development but even more, are uniquely capable of supporting the maintenance of biological processes which make development possible and sustainable. Thus, if the efforts of national park management are to be useful and are to survive as an integral part of human development upon Earth, they must be planned to serve that end.

The conceptual framework is also intended to aid the economic and social planner, the minister and political leader grasp the role and significance of wildland resources and their management. Wildland resources are neither to be mined nor to serve as escape valves for other sectors or social ills. They are among the most important cards the planner and decision-maker can deal -- they will probably determine the outcome of the game.

The Conceptual Framework

Wildlands are territories of land and water which have been little affected by modern man, or they have been abandoned and are reverting to nature. In some cases, these lands are still part of the public domain (baldio), while in others, these territories are assigned as forest reserves, agricultural development areas or are in private hands.[11]

Wildlands consist of forests, coastal lands, beaches, coral reefs, estuaries, mangroves, high-andean slopes, riverine shores and others. Some wildlands are the remnants of what were once common biological and geological formations. Others, are samples of unique structures of nature which were perhaps always rare.

Within these wild areas are found many cultural objects, sites and structures which illustrate human activities and life styles over the past 40,000 years since humans arrived in the American Hemisphere. Many of these cultural artifacts are yet to be found and uncovered from beneath the forest and soil of centuries past. Some Amerindian groups maintain ancient ways of life in remote corners and pockets of the continent.

What these seemingly diverse territories share in common is their domination by natural as opposed to human-made materials and activities. Also, and very importantly, the natural processes, such as photosynthesis, plant succession, plant and animal reproduction, soil weathering, nutrient cycles and others, take place in some type of dynamic equilibrium with climate, bedrock and the cosmos.

The wildlands of Latin America contain natural and cultural resources which produce various types of benefits of fundamental importance to human development and welfare. Some of these benefits are relatively obvious. For example, most major rivers flow from wildland catchments. Most timber comes from the margin where agriculture is overtaking the forest. A large proportion of the tourism to Latin America travels the region to see and enjoy spectacular wild places. In this way, hydroelectric power, irrigation, industrial and urban waters, wood products and much foreign exchange are derived directly from wildland resource.

Less obvious benefits include the collection of plant and animal species from which come new medicines, materials for food and industrial commodities. From wild places come fish, meat, seeds and fruits for the diets of rural dwellers. Wild animals contribute to medical research. And, throughout Latin America, local residents utilize the wildlands for their peace and solace -- they find the conditions for recreating their spirits, minds and bodies in the forest, beaches and mountains.

Yet, it is perhaps the least obvious benefits of wildlands which are the most important -- they involve the maintenance of the Planet Earth. Wildlands are an intimate and inseparable part of the "life support system" of the human habitat.[12] The examples are of processes rather than species, habitats or things: rivers flow, evolution continues, nutrients are transformed, energy is converted, genetic materials are conserved, and wastes are filtered and absorbed.

These natural processes of Planet Earth are parallel in concept to the many functions which take place in a large building. A plumbing system carries in new water to where it is needed, and carries away the old to where it must go. Wires carry electricity through controls and into lights, refrigerators, heating and cooling units, pumps and elevators. Trucks haul supplies and refuse.

If these benefits are to continue to be available and their production enhanced, then the natural and cultural resources or wildlands must be managed accordingly. They can not be left to chance and accident. The benefits of wildlands flow with little difficulty until conflicts in the use of the natural or cultural resources are introduced. Many of these resources are fragile and can tolerate only limited conflicts before they break down. Beyond some point of utilization and interference, the resources can actually become irreversibly altered. The benefits then become erratic, later intermittent and finally, they are lost forever.

Wildland resources must be integrated as a normal part of economic and social development. And, natural and cultural resources must be given the necessary environmental type of management which ensures that they contribute to development. However, because of innate characteristics it is absolutely necessary to recognize that certain resources serve development best by being managed to remain in the most natural state possible. These resources have been designed and tested by evolution during millenia to perform the basic functions of earth-maintenance, and the wisest thing humans can do is to recognize and allow them to continue doing their job.

There are areas of land and water which are sites where critical natural activities take place or where outstanding values are to be found. Such areas are of importance for water catchment, nutrient formation, waste recycling, plant and animal reproduction, animal migration routes, genetic reservoirs, and of value to science, recreation or other aspects of environmental health and social and economic development. These can be identified and singled out for special treatment.

In practical terms, the objectives of conservation must be absorbed into those of development. Conservation must be perceived as an element of development. But at the same time, it must be recognized that development can take place only within the limits of Planet Earth. Conservation is to development what maintenance is to construction. New structures are of little credit to human ingenuity unless they are maintained in good running order and provide beneficial services.

Thirteen objectives are suggested for integration within the goals traditionally considered for economic and social development. They relate wildland resources to ecodevelopment. They also cover the diverse benefits of wildland resources and serve to provide direction to the necessary management and development activities:[13]

1. Maintain large areas as representative samples of each major biological region of the nation in its natural unaltered state to ensure the continuity of evolutionary processes, including animal migration and gene flow.

2. Maintain examples of the different characteristics of each type of natural community, landscape and land form to protect the representative as well as the unique diversity of the nation, particularly to ensure the role of natural diversity in the regulation of the environment.

3. Maintain all genetic materials as elements of natural communities, and avoid the loss of plant and animal species.

4. Provide facilities and opportunities in natural areas for purposes of formal and informal education, research, and the study and monitoring of the environment.

5. Maintain and manage watersheds to ensure an adequate quality and flow of fresh water.

6. Control and avoid erosion and sedimentation, especially where they are directly related to downstream investments which depend upon water for transportation, irrigation, agriculture, fisheries, and recreation, and for the protection of natural areas.

7. Maintain and manage fishery and wildlife resources for their vital role in environmental regulation, for the production of protein, and as the base for industrial, sport and recreational activities.

8. Provide opportunities for healthy and constructive outdoor recreation for local residents and foreign visitors, and to serve as poles for tourism development which are based upon the outstanding natural and cultural characteristics of the nation.

9. Manage and improve timber resources for their role in environmental regulation and to provide a sustainable production of wood products for the construction of housing and other uses of high national priority.

10. Protect and make available all cultural, historic and archeological objects, structures and sites for public

visitation and research purposes as elements of the cultural heritage of the nation.

11. Protect and manage scenic resources to ensure the quality of the environment near towns and cities, highways and rivers, and surrounding recreation and tourism areas.

12. Maintain and manage vast areas of land under flexible land-use methods, which conserve natural processes to ensure open options for future changes in land use as well as the incorporation of new technologies, to meet new human requirements, and to initiate new conservation practices as research makes them available.

13. Finally, focus and organize all activities to support the integrated development of rural lands, giving particular attention to the conservation and utilization of marginal areas and to the provision of stable rural employment opportunities.

Wildland resources can be managed for the production of one major benefit or of several benefits at the same time. Single-purpose production methods are often applied to timber, to cultural monuments and at research sites. Other benefits are being inadvertently produced, but they are not considered as part of the management program. Sometimes, one of the other benefits is considered as a by-product. Wild animal products are often viewed as a secondary activity to timber production. Alternatively, there is the multi-purpose production approach by which several benefits are recognized. Under this approach, production is organized to obtain several benefits on a simultaneous basis.

Several of these benefits can be pursued at the same time on the same areas. For example, the conservation of genetic materials also protects the watershed and maintains a natural area for research purposes. Alternatively, some objectives will compete with others for the natural or cultural resources. If too many people come for recreation on an area conserved for its genetic materials, a conflict will arise, and some species can be pushed to the brink of extinction.

Methods have been designed by which wildlands can be managed for the objectives of conservation and development -- what shall here on be termed ecodevelopment. Some twelve such management categories are being utilized variously in different countries of Latin America and elsewhere in the world.[14] They are suggested to illustrate conceptually the kinds of alternative land management methods which may serve to meet a nation's needs.

National Parks. Areas which contain spectacular or unique natural features of national or international significance. The areas include representative samples of major biogeographical regions of the nation such as, tropical rain forest, Andean paramo and desert, which can be managed in their natural or near-natural state. There is little or no evidence of human activity within these areas.

Exceptionally, where cultural objects, structures or sites are present they are managed as integral parts of the wildland areas. National parks have potential for the development of recreation and educational activities in relation to the natural and cultural resources peculiar to the areas. Parks comprise major commitments to the protection of genetic resources. The size of national parks is sufficient to maintain the integrity of the ecological system and the scenic features. This generally requires thousands to millions of hectares.

The primary management objectives of national parks are to protect and preserve unique and representative natural and cultural areas and to protect related genetic and scenic resources. Opportunities are to be provided for environmental education and recreation, and for research and environmental monitoring. National parks are established and managed under public ownership, in perpetuity.

Natural Monuments. Areas which usually contain central outstanding natural features of national or international significance such as geologic formations, superlative waterfalls, or a unique animal or plant species. Natural monuments have little or no evidence of man's activities, and have potential for environmental education and public recreation. Where cultural features are present, they are managed as integral elements of the natural areas. Natural monuments will have sufficient size to manage and protect the central natural features. While the preservation of a subterranean cave may require that only 200 or 300 ha be managed as a natural monument, an area of coastal sand dunes or other dynamic geologic features may require 10,000 or 100,000 ha.

The primary management objectives of natural monuments are to protect and preserve outstanding natural features, and to protect related genetic and scenic resources. Opportunities are to be provided for recreation, environmental education, research and monitoring. Natural monuments are established and managed under public ownership, in perpetuity.

Scientific or Biological Reserves. Areas which contain natural formations and species of flora and fauna of significance to science and the natural environment. The wildland is essentially undisturbed by human activities except where such activities are to be investigated as part of the program. There is no need for resources of recreational and scenic importance. The size of the scientific or biological reserve will vary, depending upon the ecological features to be maintained. In general, however, the reserve must contain most or all elements of an ecosystem to ensure that the natural features of interest remain viable. This may require from 5,000 to several 100,000 ha.

The primary management objectives of scientific or biological reserves are to protect and preserve natural areas of outstanding scientific value and to provide opportunities for advanced education, research and monitoring. Scientific or biological reserves are established and managed under public ownership, in perpetuity.

Wildlife Sanctuary or Refuge. Areas where protection or other special type of management is required to ensure the continued existence of individual species or communities of resident or migratory fauna of national or international significance. The wildlife sanctuary or refuge usually contains a habitat critical to the survival of the species. Commonly, some form of habitat manipulation is required to ensure adequate food, water or cover. The size of the area depends upon the habitat requirements of the species or communities of interest. It may vary from a small marsh of 500 ha to a marine coastal area of 10,000 or 100,000 ha.

The primary management objectives of the wildlife sanctuary or refuge are to manage and maintain natural areas critical to resident and migratory fauna, to protect the related genetic resources, and to provide opportunities for education, research and environmental monitoring. The wildlife sanctuary or refuge is established and managed in perpetuity. However, the area may also require absolute protection during certain seasons of the year. The remaining periods may be utilized in some cases for limited alternative land uses. These areas can be established and managed either under public control or in cooperation with local private or communal owners.

Resource Reserves. This management category is transitory. Generally, it is comprised of an extensive, uninhabited area of difficult access. The area is usually covered with unexploited or undeveloped natural resources. Knowledge and technology are often unavailable momentarily for the appropriate management and development of the natural resources. National priorities have assigned scarce human and financial resources to the survey, inventory, evaluation and development of other areas. In the absence of clear social, economic and ecological criteria for the development of the area, it may be premature to place the area under a particular wildland category or other land use.

The primary management objective of the resource reserve is to maintain resources in their natural form, free of unplanned developments or other commitments, to ensure that options for their future use remain open until decisions based upon more appropriate knowledge and technology can be made. The resource reserve is fundamentally a holding category, to be converted to another form of wildland, agriculture or other use in the future when national priorities change.

National Forest. An extensive area, usually forested and containing sizeable areas of harvestable timber. In addition to the timber resource, these areas generally contain watersheds of importance to downstream water uses, as well as grasslands for wildlife and domestic livestock, habitats of importance for wildlife protection, subsistence and sport hunting and fishing, and scenic areas of importance for recreation and tourism. National forests offer the opportunity to utilize the natural resources in various ways and in many combinations. However, there is a commitment to maintain the productive capacity of the natural biological system. The area may have human alterations. Outstanding natural or cultural resources can be provided full protection within specified sectors of the national forest. These areas are sufficiently large to provide the territory necessary for the adequate management of the resources on a sustained-yield basis.

The primary management objectives of the national forest are to produce wood, water and forage under the multiple-use and sustained-yield concepts. Opportunities are to be provided for recreation, environmental education, hunting and fishing, and research and monitoring. While the national forest has established public authority and control in perpetuity, its management can involve cooperative relations with local private or communal owners and land users.

Game Farms and Ranches. Areas containing populations of native wild species of fauna and/or habitat suitable for the production of wild fauna protein, animal products or for viewing or sport hunting. There is considerable variation in this category, often involving combinations of public and private lands, wildlife, grazing and fishing. However, the category is limited generally to the management of native wild species within their native habitats under the principles of wildlife management. Size of these areas is determined by the habitat requirements or migratory behavior of the species of interest and the need to make production economically feasible.

The primary management objectives of game farms or ranches is to provide animal protein or animal products, including hunting and viewing, consistent with the capacity of the natural habitat. Additionally, the areas may provide protection for scenic resources, offer opportunities for recreation and tourism as well as education and research on wildlife management. These areas do not seek to preserve large representative natural areas. However, as a form of wildlife management, there is a commitment to protect genetic resources and the ecological diversity of the nation. There is also a commitment to avoid habitat destruction and adverse social and economic impact within or around the area. Game farms or ranches can be established for perpetuity, but their longevity will generally depend upon economic viability. The management of these areas can involve cooperative relations with local, private and communal owners and land users.

Protection Areas. Generally small areas which do not meet the objectives of the other wildland categories, but which require the kinds of strict land-use control provided by wildland management techniques. Such areas include the shore lands around water reservoirs, the shores of important streams, the lands adjacent to key transport routes and areas prone to avalanches and erosion. The irrational use of these lands carries the risk of degradation of water resources, major capital investments and transportation routes and the scenic context for towns and cities. Slopes of mountain ranges, the lands surrounding urban centers, watersheds and the areas adjacent to key-transport routes either on public or private lands, which are of insufficient size or quality to be placed onto one of the aforementioned categories can be managed as protection areas or zones.

The primary management objective of the protection area is to ensure stable, natural land use in zones which are critical to development and environmental conservation. This is accomplished by maintaining or re-establishing natural cover with native species where human alteration has been significant. The category should not be applied to those areas which contain outstanding natural or cultural values and which are of sufficient size or character to warrant their inclusion under one of the other wildland management categories. These areas can carry limited commitments to the protection of genetic resources, the maintenance of the nation's ecological diversity; and in some cases they can provide for limited recreational uses. Protection areas are established and managed in conjunction with water works, highways, urban green spaces, and similar projects. They are considered generally to be committed in perpetuity although with the necessary flexibility to meet the primary objectives. Where public controls are effective, land ownership can include private or communal cooperative efforts and involve decentralized local administrative responsibilities.

Recreation Areas, Scenic Rivers and Highways. Relatively large areas with outstanding natural or semi-natural scenery and the physical potential to be developed for a variety of outdoor recreational uses of national or international significance. These areas are generally in proximity to significant population centers and major transportation routes. The resources are sufficiently strong and resilient to provide recreation services for large numbers of visitors. These areas normally occur along sea and lake shores or in mountain lands offering scenic views and climatic variation. They also occur along the shores of rivers and in lands adjacent to important tourist highways. These areas are maintained in natural cover to ensure a scenic context for travelers, residents and recreationists.

The areas may be heavily altered by human activity, but through landscape manipulation the area can be restored to a semi-natural environment. Such manipulative activities, however, are limited to the use of species native to the area. Formal gardens and exotic plants and animals are excluded.

The primary management objectives for recreation areas, scenic rivers and highways are to provide recreation opportunities in a semi-natural and aesthetic environment. Additionally, these areas are capable of carrying commitments of the maintenance of genetic resources, the conservation of water resources, the control of erosion and the protection of ecological diversity. Educational facilities concerning environmental conservation are entirely consistent. The contrast with national parks and other previously mentioned categories, however, in the recreation areas is the recreation objective which dominates the management of the area. Recreation areas, scenic rivers and highways are established and managed, under public ownership, in perpetuity.

Scenic Easements and Rights-of-Way. It is often necessary to provide protection and appropriate management of areas which do not logically fall within one of the other management categories. The management of access roads, shorelines, mountain slopes, road sides, and scenic overviews can be planned and coordinated to form integral elements of national parks, forests or sanctuaries even where the lands are under private or communal ownership and operation. This is accomplished through legal arrangements whereby land-use decisions are made under cooperative agreements.

Cooperative management procedures are particularly important because they reduce the need to purchase and manage scattered parcels of wild or semi-wild lands. While these parcels are necessary for the integral management of the other categories, they may not in themselves qualify for status as parks or reserves. In some cases, inconsistent or detrimental land uses, such as those requiring the use of pesticides, can be voluntarily eliminated; in others, fire can be controlled, or poaching discouraged and access provided. In most cases, legal clauses will have to establish the right of the state to take over ownership where necessary in the national interest. Scenic easements and rights-of-way are usually established and managed under long-term legal arrangements or in perpetuity.

The management objectives of the scenic easement or right-of-way category are to protect scenic values and avoid conflicting land uses along important transportation routes, beaches, rivers and lakes, below and around scenic overlooks, along the borders of parks and rivers, and for the establishment and maintenance of access to otherwise isolated wildland areas. Easement or right-of-way areas are complimentary to other categories and are often vital to the effective protection and operation of these categories. Furthermore, easements and right-of-way offer mechanisms to utilize wildland management tools for supporting development where a large national park or other category are inappropriate. These tools also serve to reduce the size of parks and reserves by eliminating the need to include large sectors merely for their scenic, control or access value.

Cultural Monuments. Sites or areas usually containing historical, archeological or other cultural features of national or international significance. In such areas, pre-colombian sites, colonial fortresses or historic battlefields may be managed cooperatively between public land management departments and private land owners. Land use practices may be specified under legal agreements. The size of these areas will depend upon the extent of the features, ruins or structures to be preserved, and the necessary surrounding lands to ensure adequate protection and scenic backdrop to the cultural values.

There is considerable variation to cultural monuments. Of interest to wildland management, however, are those cultural objects, structures and sites which occur within wildland and which can be managed logically as an integral part of the area. Generally, there is benefit in integral management of cultural and natural resources: the natural area provides a controllable scenic context for the cultural values; the options for further excavations are kept open; and the cultural monuments provide a realistic perspective of nature which has evolved together with humans and human activities in the area. Public education and research are particularly enhanced by this symbiosis.

> The management objectives of cultural monuments are to protect and preserve cultural values and to provide opportunities for related educational, recreational, research and monitoring purposes. The cultural monument is established and managed, under public ownership, in perpetuity.
>
> Integrated River Basin or Regional Development Programs. Some river valleys and geographic regions are planned and developed on an integral basis to conserve and manage water resources, produce food and timber, develop housing and urban centers and install industrial complexes. Within this context provision is often made to manage wildlands to insure water and timber supplies, to provide recreation opportunities and to protect the scenic features of the area. Generally, historic monuments are given special protection and management. Research stations are established for agriculture, forestry, fisheries and other purposes.
>
> The primary wildland management objectives for integrated river basin or regional development programs are to conserve the water resources, control erosion and avoid sedimentation of downstream investments such as reservoirs, shipyards, bridges, recreation areas and fisheries. Additional objectives could be added to the context that other wildland categories can be incorporated consistently into the development schemes. Whereas many land uses in such programs will change in response to markets and other socio-economic factors, the benefits of wildlands will be sustainable only with stable land use. Parks and reserves would be established and managed under public ownership, in perpetuity, even within dynamic regional programs.

Each of these wildland management categories is designed to produce a particular set of benefits. To draw benefits from a management category which is designed for other purposes is to precipitate the destruction of the natural or cultural resources. To expect benefits other than those within the capability of the category is to be deceived in the future.

The design of wildland management categories is based upon consideration of the benefits desired and their relationship to the natural or cultural resources from which they are to be produced. This relationship is not arbitrary, but depends upon an understanding of the process by which benefits are produced from resources. Where several kinds of benefits are pursued which compete for use of the natural or cultural resources to the point of conflict, the resources can be damaged and the production of long-term benefits may not be sustainable.

The choice of appropriate management category can be aided by decision guides such as that illustrated in Table I-1. The thirteen objectives for conservation which have been suggested for integration with common development goals are listed along the left-hand column. The twelve proposed management categories are placed horizontally across the top of the Table. The numbers and symbols shown in the body of the Table are explained at the bottom of the page.

The decision guide is employed as follows: Where the wildland manager is searching for the appropriate management category to produce a given benefit, he first identifies the objective which focuses upon that benefit. Then, by reading across the Table from left to right on the horizontal line corresponding to the selected objective, the manager will note that the same objective will be cited under several different categories. For example, if the objective is to provide for education, research and environmental monitoring in natural areas, then the fourth line is of interest. Reading from left to right, the manager notes that this objective is a major purpose of national parks, natural monuments, scientific or biological reserves and wildlife sanctuaries (symbol ()). The objective dominates the management of the entire area of the scientific or biological reserve (symbol 1), and dominates only portions of the other three categories (symbol 2). Furthermore, the objectives can dominate portions of several other categories to the right (symbol 2), or may or may not be applicable in other cases where the resources do not possess the necessary capacity to support these activities (symbol 4).

If the wildland manager wishes a management method which gives primary emphasis to education, research and monitoring, the guide that he chooses suggests the scientific or biological reserve. However, other factors enter into the decision. By reading the Table up and down in vertical columns, the manager can note which other objectives can also be considered at the same time. In a scientific or biological reserve, the Table suggests that recreation and tourism, timber production and multi-purpose management is not applicable (symbol -). Scenic beauty is protected only as a by-product (symbol 3).

The decision guide assists the wildland manager to select the category most appropriate for producing the benefits of interest. Naturally, the names and details of the several categories will vary from country to country. The guide also illustrates the limits of each category. Like any factor or enterprise, the individual category can be made to produce only those certain benefits for which it is designed.

Thus, if a broad range of wildland benefits is to be produced for ecodevelopment, then several management categories must be put into action at the same time. National parks, biological reserves, forest

TABLE I-1

DECISION MAKING GUIDE TO THE ALTERNATIVE CATEGORIES FOR THE MANAGEMENT OF WILDLANDS TO SUPPORT ECO-DEVELOPMENT

OBJECTIVES FOR CONSERVATION AND DEVELOPMENT	ALTERNATIVE MANAGEMENT CATEGORIES											
	National Park	Natural Monument	Scientific or biological Reserve	Wildlife Sanctuary	Resource Reserve	National Forest	Game Reserves, Farms, & Ranches	Protection Zones	Recreation Areas	Scenic Easements & Rights of-way	Cultural Monuments	Watershed programs, River Valley Corps
Maintain sample eco-systems in natural state.	(1)	(1)	2	(1)	—	2	4	4	4	4	4	4
Maintain ecological diversity & environmental regulation.	(1)	(1)	(3)	(1)	(1)	(1)	(3)	(3)	(3)	(3)	(3)	(3)
Conserve genetic resources.	(1)	(1)	3	(1)	—	3	3	3	3	3	3	2
Provide education, research & environmental monitoring.	(2)	(2)	(1)	(2)	—	2	4	4	2	4	2	2
Conserve watershed production.	3	3	3	3	—	(2)	3	(1)	3	3	4	(1)
Control erosion, sediment & protect downstream investments.	3	3	3	3	—	(1)	3	(1)	3	3	4	(1)
Produce protein from wildlife: sport hunting and fishing.	—	—	—	—	—	(2)	(1)	—	—	—	—	2
Provide for recreation and tourism.	(2)	4	—	4	—	(2)	2	—	(1)	3	4	2
Produce timber on sustained yield basis.	—	—	—	—	—	(2)	—	4	—	—	—	2
Protect sites and objects of cultural, historical, archaeological heritage.	(1)	4	—	—	—	4	—	—	4	—	(1)	2
Protect scenic beauty and green areas.	(1)	(1)	3	3	—	3	3	3	(1)	(1)	4	3
Maintain open options through multipurpose management.	—	—	—	—	(1)	(1)	—	3	3	3	—	(1)
Support rural development through rational use of marginal lands and provision of stable employment opportunities.	(3)	(3)	(3)	(3)	(4)	(1)	(1)	(3)	(1)	(3)	(3)	()

( ) Major purposes for employing management systems.

1 Objective dominates management of entire area.

2 Objective dominates management of portions of area through "zoning".

3 Objective is accomplished throughout portions or all of area in association with other management objectives.

4 Objective may or may not be applicable depending upon treatment of other management objectives, and upon characteristics of the resources.

— Not applicable.

(*) In the case of the Watershed Programs or River Valley Corporations, the areas normally include towns, agriculture and other land uses.

Source: Miller, Kenton R. 1975. Guidelines for the Management and Development of National Parks and Reserves in the American Humid Tropics. In: The Use of Ecological Guidelines for Development in the American Humid Tropics. Proceedings of IUCN Meeting, Caracas, 1974. pp. 94-95.

reserves or any other individual category alone will not provide a basis for producing the benefits necessary for ecodevelopment. Rather, what is needed is a system of wildlands -- a network of several national parks, several biological reserves, several forest reserves and the like.

Furthermore, these categories represent long-term commitments by the individual nation to its citizens and to the world community. Since wildlands contain resources which are (or will become) rare and unique, generally fragile and susceptible to irreversible loss, and intimately related to the life support system of all peoples, the areas to receive special management must be dedicated on a perpetual basis through the highest legislative authority which is sovereign over the territory. The one exception is the case where a "resource reserve" is established to hold timber, minerals, soils or space until inventories can be made, the resources are evaluated and decisions for land-use are completed.

A network or system of wildlands will be required to provide for the nation's water catchments, genetic materials, research and monitoring needs, environmental equilibrium, timber resources, cultural monuments and places of solace and inspiration. The system will include such categories as national parks, national forests, wildlife sanctuaries, scientific reserves, protection zones, cultural monuments, recreation areas and various forms of valley or development corporations to provide appropriate management for species, habitats and natural processes. The individual conservation units and the system of wildlands itself can be designed to support the ecodevelopment of the nation.

The individual conservation units require on-site management by trained personnel. Wildland management is a complex effort. Existing or to-be-established departments of government are to be entrusted with the custodianship and management of particular categories. While several public institutions such as the natural resource department, forest service, park and wildlife service and historical society may be charged with the management of certain categories of the system, the responsibility of overall coordination lies at the highest level of government.

The national system of wildlands can only serve ecodevelopment by being integrated directly into the national planning process. The national parks, forests, monuments and other wildlands must be planned together with agriculture, communications, water works, human settlements and other major activities. The responsibility for the wildlands is of no less importance and consequence than other development activities. While wildland management is a relatively recent science and land-use practice, considerable advancement has been made in Latin America in the recent decade. Experience already demonstrates that national systems of national parks can be designed, the management and development of individual conservation units can be planned, the competence to actually ensure that conservation units are appropriately cared for can be developed, and the benefits from these resources can be reaped. Experience also demonstrates that benefits from wildlands can be enjoyed by today's generation as well as the generations yet to come.

Many wildlands are located within the upper reaches of river basins, in the hinterlands and along international boundaries. As such, there are interests in the use and management of these wildlands which are common to two or more nations. Cooperative efforts by several nations to provide appropriate environmental management to wildlands carry advantages in shared costs and benefits. While each nation can design and implement a system of wildland areas to meet its particular requirements, it can also work in the context of regional and international cooperation to incorporate strategies common to several nations.

Through the United Nations, regional, non-governmental and bilateral organizations and development banks, nations can develop and implement cooperative programs and activities in the management of natural and cultural resources. These organizations and their related mechanisms provide opportunities for the nations of Latin America and the world to express their concerns and interest in relation to conservation and development and to transform ideas into realities. Such efforts transcend immediate political issues and conflicts and offer a bridge for peaceful international relations on matters which affect the heritage and habitat common to all humans.

APPENDIX 1-A

WHAT IS ECODEVELOPMENT?

Ecodevelopment is a part of the Environment and Development activities of UNEP, that has undertaken a series of projects and studies in their domain, to which it gives its support.

This constitutes a new approach to development, a search for a way to harmonize economic and social objectives while ensuring a sound management of the environment as well.

The main characteristics of ecodevelopment are the following:

1. In each eco-region, effort is made to exploit specific resources in order to meet the basic needs of the population in term of food, housing, health and education, these needs being defined in a realistic and autonomous way, so as to avoid the ill effects of an imitation of consumer styles in rich countries.

2. Man being the most precious resource of all, ecodevelopment must contribute to his fulfillment first. This concept includes employment, security, sound human relations, respect of the various cultures or, in other words, the achieving of an adequate social ecosystem. There is a symmetry between the possible contribution of ecology and social anthropology to planning.

3. The identification, use and management of natural resources is made in diachronic solidarity with the generations to come: predatory practices are banned and the exhaustion, unavoidable in the long term, of some non-renewable resources is retarded by eliminating wasteful uses on the one hand, and, on the other hand, resorting whenever possible to renewable resources which should never be exhausted if they are adequately exploited.

4. The negative impacts of human activities on the environment are reduced, thanks to the use of forms of production organization enabling man to take advantage of all the complementarities and utilize waste for productive aims.

5. In tropical and sub-tropical areas especially, but everywhere else as well, ecodevelopment insists upon the natural ability of a region for all forms of photosynthesis and favours a low profile of energy consumption for commercial sources.

6. Ecodevelopment implies a special technological style. Eco-techniques exist and can be devised for production of food, housing, energy, for new and imaginative ways of industrialization of renewable resources, for labour intensive conservation programmes. Elaboration of eco-techniques will play a very

important part in ecodevelopment strategies, as various - economical, social, ecological - objectives can be harmonized at this level, technological change being the multidimensional variable of planning par excellence. However, it would not be right to equate ecodevelopment with a technological style. It implies patterns of social organization and a new education system.

7. The institutional framework of eco-development cannot be defined once for all regardless of each specific case. We can, all the same, put forward three basic principles:

    a. Ecodevelopment implies the creation of a horizontal authority able to overcome the sectorial approaches, concerned with all the aspects of development while always taking into account the complementarity of the various measures undertaken.

    b. Such an authority cannot be efficient without the participation of the concerned population in the working out of ecodevelopment strategies. It is essential to the definition and the harmonization of concrete needs, to the identification of the productive potentialities of the ecosystem and the organization of the collective effort for its utilization.

    c. Lastly, it is necessary to make sure that the populations that work it out are not deprived of its results to the benefit of intermediaries who stand between local communities and the national or international market.

    These principles could be applied without too many problems in the areas of the Third World where the agrarian reform has been achieved and also wherever community structures are still alive.

8. A necessary complement of participatory structures of planning and management is an education that prepares for them. This is especially true for ecodevelopment when people's attention must be drawn, at the same time, to the notion of environment and to the ecological aspects of development.

    In last analysis, the problem is to internalize this dimension, i.e. to change the system of values implying domineering attitudes toward nature or, on the contrary, to maintain or reinforce, where it still exists, an attitude of respect for nature which prevails in certain cultures. This target can be fulfilled either by formal or informal education.

    In short, ecodevelopment is a style of development which insists on specific solutions to a particular problem in each eco-region, taking into account ecological and cultural contexts as well as present and long term needs. Without denying the importance of exchanges, it tries to react against the prevailing fashion for so-called universal solutions applicable to all situations. Instead of making too large an allowance for external assistance, it believes in the ability of human societies to assess their own problems and find original solutions, while drawing inspiration from other people's experiences. It is opposed to passive transfers and the spirit of imitation, insisting, on the contrary upon self-reliance.

Without going too far in an ecological determinism, it suggests that a creative effort to take advantage of the margin of liberty offered by the environment is always possible, great though climatic and natural constraints maybe. Evidence of this is given by the variety of cultures and human achievements in comparable environments. But knowledge of the environment and a will to achieve a lasting balance between man and nature are necessary steps to success.

Source: Wallaceana, September 1977, Volume 10, pp. 50-53; taken from Ecodevelopment News, February 1977.

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CHAPTER II

THE GROWTH AND DEVELOPMENT OF NATIONAL PARKS IN LATIN AMERICA

Introduction

Among the several categories of wildland management it is the national park which has received most universal application in Latin America. From the birth of the "national park idea" at Yellowstone in 1872 to the present, some 100 nations of the world have established over 2,000 national parks. Latin America is part of this movement with some 120 national parks in 17 countries covering 18.5 million hectares.[1]

Within the context of diverse social, economic, political and cultural systems found among the nations of Latin America and the world, similar precepts of park management have developed. Yet considerable differences have arisen in the employment of park management concepts and principles which, in general, can be explained by the historical and environmental variation among nations.

When national parks were first established in Latin America they were seen by different groups as means to preserve natural areas, to develop recreation and tourism areas, and to develop rural and boundary lands. Thus, the early parks were located in isolated inaccessible areas, along beaches or in resort areas, and along frontiers or in newly colonized territories.

Latin America's conservation leaders expressed concern over the variation in uses of the park idea. They joined colleagues from the other continents to seek international criteria. In early international meetings, their role was often passive. During successive years, their presence was felt as park management concepts were discussed and guidelines formulated.

The role of national parks in the ecodevelopment of Latin America has grown considerably during the past decade as larger numbers of prepared personnel work with larger budgets on more park lands. Recent experience shows that the potential of national parks to support ecodevelopment is far greater than previously realized. Can national parks contribute significantly to conservation and development in the coming decades? Traditionally, the argument has been, "Yes, if the government will only assign more land, personnel and budget to the parks department." However, times have changed. Political leaders, planning boards and international bodies are beginning to recognize the need for conservation land management. They are becoming aware of the diverse benefits to be derived from wildlands and the dependency of development upon careful environmental management.

The ball is actually in the court of conservation managers. It is time to demonstrate the relationship between parks, conservation and development. It is time to show specifically the long line of goods and services which can be produced from wildlands. Isolationism from the social and economic development process is no longer an acceptable strategy.

All categories of wildlands have their necessary place in ecodevelopment. Parks can only address certain elements of the problem. Outmoded is the separation among the various approaches to conservation management. Parks are no longer to be viewed as ends in themselves but rather as means to achieve some of the key goals of the national and global community.

This chapter will summarize past events which have influenced concepts, policies, laws and the growth and development of national parks in Latin America. The role of national parks in ecodevelopment will be examined. Recent resolutions, recommendations and policies of national, regional and international institutions will point to the new mandate for national park managers to join the national development effort.

The Birth of the Park Idea

The national park idea was born in a spectacular wilderness setting in the United States. At the last campsite of the Washburn-Langford-Doane Expedition to Yellowstone on the night of September 12, 1870, the explorers agreed to search for a mechanism which would guarantee the protection of the natural wonders of the area against destructive exploitation and to set these resources aside for public use and enjoyment.[2]

The expeditioners expressed their ideas in terms of "protection of natural wonders" and "public enjoyment". They had already witnessed the ravages of unregulated exploitation of natural resources on both public and private lands. They had witnessed the destruction of wildlife, forests, stream banks and scenery in the search for private survival and self-interest.

One can well imagine their discussions around that campfire. Conceivably, it parallels those taking place even at this moment in Patagonia, the Amazon, the Central American lowlands, the Andean forests and the Caribbean islands. They discussed the threats of commercial exploitation of the geysers, the bison and elk. They speculated whether their grandchildren would have the opportunity to enjoy these natural wonders and the many yet unknown benefits to be derived from them. They were sufficiently informed to imagine the scientific importance of the natural resources. And, surely they thought about the future, when the lands surrounding the protected area would all be settled and utilized. The protected area would perhaps stand like an island in the sea until man learned to utilize the land adjacent to the park in harmony with nature.

On March 1, 1872, the Senate and House of Representatives of the United States approved an Act "... to set apart a certain tract of land laying near the head waters of the Yellowstone River as a public park..."[3] Following a legal description of the territory, the law states that the area:

> is hereby reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park or pleasuring-ground for the benefit and enjoyment of the people; and all persons who shall be considered trespassers and removed therefrom.[4]

The area was placed:

> under the exclusive control of the Secretary of the Interior, whose duty it shall be, as soon as practicable, to make and publish such rules and regulations as he may deem necessary or proper for the care and management of the same. Such regulations shall provide for the preservation, from injury or spoilation, of all timber, mineral deposits, natural curiosities, or wonders within said park, and the retention of their natural condition.[5]
>
> He shall provide against the wanton destruction of the fish and game found within said park, and against their capture or destruction for the purposes of merchandise or profit.[6]

Forty-four years later on August 25, 1916, Congress created the National Park Service within the Department of the Interior:

> The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.[7]

Thus, in two pieces of legislation, five fundamental precepts of the "park idea" were established: A national park is an area which is to be (a) withdrawn from settlement, occupancy or sale, (b) for the benefit and enjoyment of the people, (c) a repository of natural and historical resources in their natural state, (d) kept free of commercial use (in the physical sense), and (e) managed for the preservation of the resources and for public use in ways which will leave it unimpaired for future generations of the people. Taken together, these precepts form what can be aptly termed the "Yellowstone Manifesto" -- a statement of moral, political and economic policy and philosophy. It marks the turning point in modern times where resources (land, nature and cultural objects and sites) are to be held in trust by the state for all people, now and in the future, and where man's managerial and technical skills are to be applied in order to derive benefits in ways which guarantee the quality and integrity of the natural environment.

The "park idea" spread to Canada in 1885, New Zealand in 1894, and Australia and South Africa in 1898. Countries in Latin America were among the earliest nations to establish national parks. Mexico established the El Chico forest reserve in 1898 which was subsequently renamed and considered the nation's first national park. Argentina initiated her first park with a donation of 7,500 hectares of land from Francisco P. Moreno in 1903 which became the basis for the "National Park of the South" in 1922. This area later became Nahuel Huapi National Park in 1934. In the interlude, Chile established the adjoining Vicente Perez Rosales National Park in 1926, in the scenic South Andean Lake District. Ecuador followed with the Galapagos Islands National Park in 1934, and Brazil and Venezuela established their first parks in 1937.[8]

As elsewhere, the Latin American nations established their first national parks at a time when ecological guidelines were in rudimentary stage of development. Since wildlands were generally considered to be self-regulatory -- that in wilderness, nature was in balance by definition -- man's assistance was considered unnecessary beyond the enactment of laws. Many of the parks were virtually inaccessible except to expeditions. The individuals or groups which were responsible for initiating the original proposals for these parks were often interested in specific resources such as botanical or zoological features, or perhaps tourism or the protection of water resources. There was little unity of criteria within, let alone among nations.

Development of Common Concepts for Park Management

A general appreciation of the diversity and wealth of natural and cultural resources of Latin America is sufficient to imagine the kinds of areas which early conservationists considered to require protection. They eyed Andean mountain forests, unique flora and fauna, spectacular geologic formations, and pre-Colombian cultural sites. Their views were tempered with diverging social, economic and political attitudes. There is little wonder that the development of the park idea in each country took on individual characteristics. In fact, even particular regions within given countries developed unique concepts about national parks. What had appeared to be so simple and straightforward in the Yellowstone Manifesto had become rather complex when applied in different countries.

Interest grew in the formulation of a lengua franca or common language of conservation. Many individuals worked to this end. Many meetings were held to develop common concepts,[9] of which several are important to note. The nations of Europe and (the then colonial) Africa prepared the first draft of a document on concepts and nomenclature in 1901. The document was revised and eventually signed as an international convention at London in 1933. Among the significant results of this pioneering meeting was the proposition of a set of terms and definitions for alternative types of "conserved natural areas."[10]

> The expression "national park" shall denote an area (a) placed under public control, the boundaries of which shall not be altered or any portion be capable of alienation except by the competent legislative authority, (b) set aside for the propagation, protection and preservation of wild animal life and wild vegetation, and for the preservation of objects of aesthetic, geologic, prehistoric, historical or archeological, or other scientific interest for the benefit, advantage, and enjoyment of the general public, (c) in which the hunting, killing or capturing of fauna and the destruction or collection of flora is prohibited except by or under the direction or control of the park authorities.
>
> In accordance with the above provisions, facilities shall, so far as possible, be given to the general public for observing the fauna and flora in national parks.
>
> The term "strict natural reserve" shall denote an area placed under public control, throughout which any form of hunting or fishing, any undertaking connected with forestry, agriculture, or mining, any excavations or prospecting, drilling, levelling of the ground, or construction,. any work involving the alteration or the configuration of the soil or the character of the vegetation, any act likely to disturb the fauna or flora, whether indigenous or imported, wild or domesticated, shall be strictly forbidden;in which it shall be forbidden to enter, traverse, or camp in without a special written permission from the competent authorities; and in which scientific investigation may only be undertaken by permission of those authorities.

Similar efforts were in motion in the Americas. In 1940, under the auspicies of the Pan American Union, a convention was drafted in Washington, D.C. entitled: "Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere".[11] (The full text of the convention is presented in Appendix II-A.) As with the work of the London Convention, the document also elaborated terms and definitions for protected areas.[12]

> 1. The expression NATIONAL PARKS shall denote: Areas established for the protection and preservation of superlative scenery, flora and fauna of national significance which the general public may enjoy and

from which it may benefit when placed under public control.

2. The expression NATIONAL RESERVES shall denote: Regions established for conservation and utilization of natural resources under government control, on which protection of animal and plant life will be afforded insofar as this may be consistent with the primary purpose of such reserves.

3. The expression NATURE MONUMENTS shall denote: Regions, objects, or living species of flora or fauna of aesthetic, historic or scientific interest to which strict protection is given. The purpose of nature monuments is the protection of a scientific object, or a single species, as an inviolate nature monument, except for duly authorized scientific investigations or government inspection.

4. The expression STRICT WILDERNESS RESERVES shall denote: A region under public control characterized by primitive conditions of flora, fauna, transportation and habitation wherein there is not provision for the passage of motorized transportation and all commercial developments are excluded.

The nations of Latin America have been slow to sign and ratify the Convention (see Appendix II-B). However, this effort along with the London Convention, opened the door for regional and world-level cooperation in the conservation of natural resources. While few nations employed the suggested terminology and nomenclature as recommended, the conventions did serve to generate debate and dialogue within conservation organizations, forestry, game and park departments and international institutions.

Following the interval of the Second World War, individuals, organizations and nations interested in the conservation of nature and natural resources sought to develop a mechanism for guiding international cooperation. Of particular concern were issues related to the rapid loss of habitats to development projects, the increasing list of species in danger of extinction, and the absence of an international forum to coordinate and promote conservation activities among nations and organizations.

Under the aegis of the Swiss League for the Protection of Nature, Government of France and UNESCO, 130 delegates representing 18 governments, 108 national institutions and 7 international organizations, met in the Château de Fontainebleu from September 30 through October 7, 1948.[13] The International Union for the Protection of Nature (IUPN) was founded during this historic meeting. The first IUPM constitution was signed by delegates from 18 governments including 5 from Latin America.[14] The first ten-member Executive Board included two Latin American conservationists.

At the Seventh General Assembly, at Edinburg, Scotland in June 1956, a revised Constitution was adopted establishing the Union's new name -- International Union for the Conservation of Nature and Natural

At the Seventh General Assembly, at Edinburg, Scotland in June 1956, a revised Constitution was adopted establishing the Union's new name -- International Union for the Conservation of Nature and Natural Resources (IUCN). The change was to underline the philosophy of the Union, that "conservation and production are natural allies, not rivals."[15]

In the ancient amphitheater at Delphi, Greece, in October 1958, the Eighth General Assembly resolved to establish the International Commission on National Parks (ICNP).[16] The members of the Commission, as their first activity, requested their first Chairman, Dr. H.J. Coolidge, to call the attention of the United Nations to the importance of national parks and to the need for world-wide efforts at the conservation of nature and natural resources.

The United Nations Secretary-General, Dag Hammarskjold, referred the matter to the Economic and Social Council (ECOSOC) of the United Nations. The United Nations accorded recognition to the significance of national parks and equivalent reserves as an aspect of the wise use of natural resources, when the Economic and Social Council adopted resolution 713 (XXVIII) at its twenty-seventh session in 1959:[17]

> The Economic and Social Council,
> Noting that national parks and equivalent reserves have been established in most countries which are Members of the United Nations or the specialized agencies, and that they contribute to the inspiration, culture and welfare of mankind,
>
> Believing that these national parks are valuable for economic and scientific reasons and also as areas for the future preservation of fauna and flora and geologic structures in their natural state,
>
> (1) Requests the Secretary-General to establish, in co-operation with UNESCO, FAO, and other interested specialized agencies, a list of national parks and equivalent reserves, with a brief description of each, for consideration by the Council at its twenty-ninth session, together with his recommendations for maintaining and developing the list on a current basis and for its distribution;
>
> (2) Invites State Members of the United Nations and of the specialized agencies to transmit to the Secretary-General a description of the areas they desire to have internationally registered as national parks or equivalent reserves; and
>
> (3) Furthermore invites the International Union for Conservation of Nature and Natural Resources and other interested non-governmental organizations in consultative status to assist the Secretary-General, upon his request, in the preparation of the proposed list.

The first compilation of national parks was issued in two volumes by ECOSOC[18] and by IUCN.[19] The compilation was based upon responses to a questionnaire which was prepared by the ICNP and directed to all nations of the world by the UN Secretary-General.[20] Eighty-one nations responded during a two-year period.[21]

Subsequently, J.P. Harroy became the second Chairman of the ICNP. He intensified the efforts of the Commission to carry out the ECOSOC mandate including field trips to study the current situation of national parks throughout the world. He visited key parks in Latin America. The first edition of the United Nations List of National Parks appeared in 1967 in French.[22] A major contribution of this work was the specification and application of four criteria for the evaluation of individual conservation units: size, protection, staff and budget.[23] These criteria had been established by the ICNP and were based upon the London and Washington Conventions and other relevant documentation. An additional contribution of the volume was relatively parallel treatment of sites from all of the world's regions. For the first time the conservation efforts in Latin America were placed into perspective with the rest of the world. An English version of the list was edited by Hugh Elliot and published in 1971.[24]

The "international park movement" emerged in 1962 when specialists and observers from 63 nations gathered in Seattle, United States, to hold the First World Conference on National Parks.[25] In addition to the first ECOSOC/IUCN compilation of National Parks, other significant documents were presented to the meeting. C.F. Brockman made a systematic presentation of the nomenclature related to conservation areas throughout the world.[26] His paper emphasized the incredible diversity of terms and definitions reached by 1962.

Brockman's paper provided the basis of dialogue on an issue of great concern to conservationists, namely that the name of an area should reflect the objectives being pursued by conservation management. Focusing specifically upon Latin America, M. Buchinger later studied the influence of nomenclature on conservation policies.[27] She stressed the importance and urgency of formulating and applying uniform criteria throughout the region to guide nations towards common concepts and management practices.

It was at the Tenth General Assembly of the IUCN in New Delhi, India, in 1969, that a DEFINITION OF NATIONAL PARKS was drafted and endorsed:[28]

> A national park is a relatively large area: 1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educative and recreative interest or which contains a natural landscape of great beauty, and 2) where the highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation of the whole area and to

> enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment; and 3) where visitors are allowed to enter, under special considerations, for inspirational, educative, cultural and recreative purposes.

The documentation which was prepared by Harroy, Brockman, Buchinger and others, made it quite clear that the name "national park" had come to mean different things in different countries. The delegates to the IUCN meeting in New Delhi were determined to lay the basis for a reorientation of terms and a stricter use of the name "national park". Accordingly, the IUCN definition also urged governments "not to designate as national park":[29]

1) A 'scientific reserve' which can be entered only by special permission (e.g., strict nature reserve).

2) A 'natural reserve' managed by a private institution or a lower authority without some type of recognition and control by the highest competent authority of the country.

3) A 'special reserve' as defined in the African Convention of Nature and Natural Resources of 1968 (fauna or flora reserve, game reserve, bird sanctuary, geological or forest reserve, etc.).

4) An inhabited and exploited area where landscape planning and measures taken for the development of tourism have led to the setting up of 'recreational areas' where industrialization and urbanization are controlled and where public outdoor recreation takes priority over the conservation of ecosystems (parc naturel regional, nature park, naturpark, etc.). Areas of this description which have been established as 'national parks' should be redesignated in due course.

During the immediate years following the New Delhi meeting the new definition of national park was applied in the establishment of new parks in the re-orientation of existing areas. Members of the ICNP applied the definition in the preparation of subsequent editions of the United Nations List of National Parks. These efforts readily demonstrated that a definition alone did not comprise a sufficient tool to help determine "what exactly is, and is not, a national park?" The ICNP set out to elaborate a revised set of CRITERIA FOR NATIONAL PARKS. Based substantially upon the earlier work of Harroy, the ICNP elaborated and approved five criteria during the Eleventh General Assembly at Banff, Canada in 1972,[30] dealing with legal protection, effective protection, size, exploitation, and management activities. (The 1972 IUCN criteria for national parks are summarized in Appendix II-C.)

During the same period that the concepts of national parks were being discussed and clarified at the world level, foresters, agronomists, biologists and administrators were developing their ideas at the Latin America regional level. Two regional bodies were formed: The Latin American Forestry Commission (LAFC) as a statutory body of the Food and Agriculture Organization of the United Nations (FAO), and the Latin American Committee on National Parks (CLAPN), initially a body of the IUCN.

At the Ninth meeting of the LAFC, held in Curitiba, Brazil, in 1964, the Working Party on National Parks and Wildlife was established and held its first session.[31] The Working Party's first chairman, Italo N. Costantino of Argentina was requested by the delegates at the Second Session in Trinidad and Tobago to initiate work on a DECLARATION OF PRINCIPLES to guide the formulation of policy for national parks. A draft declaration was presented to the Third Session (Eleventh Meeting of LAFC) in Quito, 1970 by the FAO Secretariat. The document was based upon the work and comments of individuals and governments from the region. The Working Party sent the document to the Commission which approved it as part of its Final Report.[32] The document focuses upon key issues including (a) the need to analyze the relationship between national park management and rural development, (b) the relationship between natural and cultural resources, and (c) the need to consider ecological, economic and sociological factors if wildlands are to support rural development. The document suggests that a wide range of alternative wildland uses is required to address the many needs of man including the protection of the environment and a just utilization of natural resources. (The full test of the FAO/LAFC Declaration of Principles is presented in Appendix II-D.)

The first World Conference on National Parks (1962, Seattle, United States) recommended that a Latin American committee of the IUCN be established.[33] On March 5, 1964, the founding members of the Latin American Committee on National Parks (CLAPN) met in Quito, Ecuador to formulate the committee's objectives and initiate its activities.

CLAPN has sponsored conferences, congresses and working sessions throughout the region.[34] The officers of the Committee have worked with the Organization of American States, the Inter-American Development Bank and other regional and world bodies in an effort to promote a more appropriate balance between conservation and development in Latin America. CLAPN distributes information related to training opportunities in the national parks field as well as a newsletter which is sent to all members and participants in the Committee's events. The Committee has participated in the organization of regional courses and seminars in Latin America and North America. Among these has been a series of seminars on the management of natural areas and tourism.

Role of National Parks in Ecodevelopment

The foregoing sections of the chapter illustrated that Latin American forest, park and wildlife officers have been involved in the development of concepts and ideas for park management since the earliest international meetings. These leaders also worked on developing the definition and criteria for national parks and assisted in the preparation of a declaration of principles for park policy and management. But what of the practice of park management? Are the concepts and ideas being applied in the field?

Park management in Latin America was initiated in Argentina, Brazil, Mexico and Venezuela in the 1930's and 1940's. Land clearing and settlement for agriculture, grazing, water development and highway construction were initiated and accelerated in the 1950's throughout the region. Wildlands gave way to other land uses. It was apparent that the national parks and forest reserves would soon become islands of nature amidst a sea of developed landscapes. Some extreme cases were obvious where the islands were green while the surrounding sea was becoming brown and dry with desolation.

The dichotomy of green islands and brown deserts, however exaggerated, expresses the attitudes of park management during the 1950's and 1960's. Antagonism was evidenced by the burning of park lands, gunfire, poaching of wildlife, timber and plants, and a general lack of cooperation between conservation managers on the one hand, developers and the general community on the other.

A major change in attitudes and approach was initiated in the mid-1960's. The aforementioned activities of IUCN, the FAO/LAFC, and CLAPN, the training efforts of the Interamerican Institute of Agriculture Sciences (of the OAS) and of FAO, and the various conferences on conservation in the United States, Europe and in Latin America, provided a new conceptual basis for park management: Conservation was to become a vital and integral element of development. Parks were to be managed as interdependent elements along with other activities and land uses in the rural landscape.

Was this really something new?... The role of national parks had always been purported to be conservation of nature for present and future generations of mankind. What was indeed new was the rapid rate of change in land use and development. For example, virtually every country of the region had instituted national planning and centralized coordinated procedures for the budgeting of public funds. In order to obtain a budget, public departments, including those for forestry, parks and wildlife, had to present detailed programs and projects to explain what would be done with the money. The planning ministries were faced with mounting requests for land, public funds, educated and trained personnel and imported equipment. With increasing economic growth and development these resources became scarce and competition for their use increased among departments.

Departments responded with even more elaborate plans and programs which enumerated the costs and the benefits related to their proposed activities. In relation to national parks, the forestry, parks and wildlife departments found themselves in the rather undignified situation of "not producing anything" and costing a great deal! They spoke of "protection" forests in contrast to "production" forests; of "saving" nature as opposed to "exploiting" it.

There is as yet no acceptable comprehensive accounting system for the inputs and outputs related to national parks. Some items, such as building materials, gasoline, machinery and vehicles, are bought and sold on commercial markets and therefore have established prices and costs. Most inputs and outputs of national parks, however, are non-material goods and services (so-called intangibles) or are not measured in the market place (so-called incommensurables). Even though water and a flowing stream, a cultural monument, an inspiring view, and the genetic materials of wild species are very real, they simply do not carry a price tag.

The role of national parks in development and conservation in Latin America cannot be presented in neat numerical form, with tables and curves, all translatable into the common denominator of U.S. dollars. Nevertheless, these goods and services exist; they are being utilized and enjoyed constantly by millions of individuals; and their absence or loss would be felt directly by the entire population of the region and world. On the cost side, land, public budget and the skills and time of managers, planners, scientists, builders and maintenance men are being spent on the management and development of these resources and wildland areas.

In Chapter I, the conceptual framework of wildland management designated a particular part for national parks to play in ecodevelopment. Ten objectives were suggested for park management. It is intended that these statements of objectives express the original concepts of "national park" in terms of current language and the need for relevance to environmental management and economic and social development. (See Table II-1.)

The primary objectives of national parks are those which dominate management throughout the entire area of the park: (1) to maintain representative samples of major biotic units as functioning ecosystems, in perpetuity; (2) to maintain ecological diversity and environmental regulation; (3) to maintain genetic resources, (4) to maintain sites and objects of cultural heritage, and (5) to protect scenic beauty.

Also primary, but restricted as necessary to portions of the area of the park to avoid conflicts in management, are the provision of facilities and services for (1) education, research and environmental monitoring, and (2) for recreation and tourism.

A final primary objective of national parks is to support rural development and stimulate and sustain the rational use of marginal lands.

There are two associated objectives for national park management: (1) the maintenance of watershed production, which may dominate the management of particular areas in the park, and (2) the control of erosion and sediment and the protection of downstream investments.

TABLE II-1

Normative Objectives For The Management Of National Parks[1]

	Normative Objectives for Park Management	Relationship to Management
1.	Maintain representative samples of major biotic units as functioning ecosystems in perpetuity.	Primary, applies to the entire park area.
2.	Maintain ecological diversity and environmental regulation.	Primary, applies to the entire park area.
3.	Maintain genetic resources.	Primary, applies to the entire park area.
4.	Maintain objects, structures and sites of cultural heritage.	Primary, applies to the entire park area.
5.	Protect scenic beauty.	Primary, applies to the entire park area.
6.	Facilitate education, research and environmental monitoring in natural areas.	Primary, but restricted to portions of the park.
7.	Facilitate public recreation and tourism.	Primary, but restricted to portions of the park.
8.	Support rural development and the rational use of marginal lands.	Primary, but accomplished pursuant to all other objectives.
9.	Maintain watershed production.	Associate, and accomplished in relation to the pursuance of other objectives.
10.	Control erosion and sediment and protect downstream investments.	Associate, and accomplished in relation to the pursuance of other objectives.

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[1] Taken from Table I-1.

These associated objectives generally act as norms to guide all management and development activities in the park.

If these conceptual objectives for park management are acceptable then they can serve to orient a review of the current role of national parks in ecodevelopment.

Maintain Representative Samples of Major Biotic Units as Functioning Ecosystems in Perpetuity

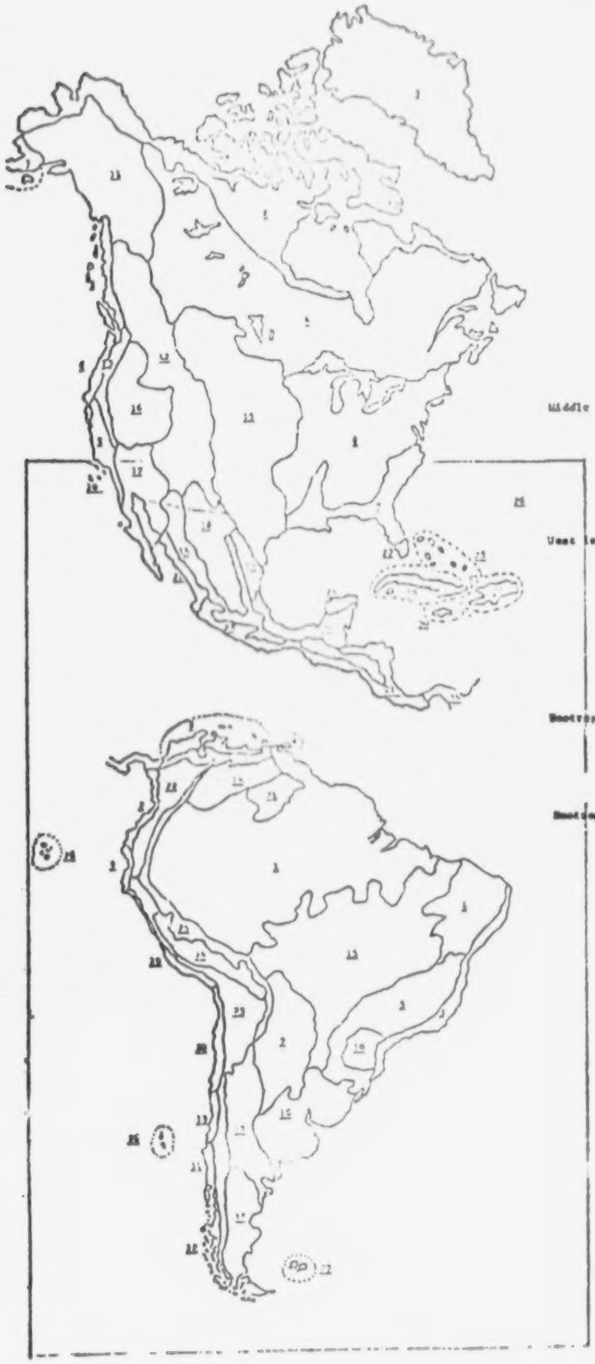
The role of national parks in the maintenance of samples of major biotic units as functioning ecosystems for perpetuity can be examined on a preliminary basis by relating the location of current parks to the zonification of major biotic units. Two problems are evident: first, there is little universal agreement on a system of classification of biotic units of the world; and second, it is necessary to work at a mapping scale in which it is difficult or impossible to show accurately the boundaries of national parks and biotic types. A system which offers a preliminary assessment of the situation has been proposed by Dasmann[35] and IUCN.[36] (Details on the system are presented in Appendix II-E.)

The biotic provinces of Latin America are shown in Figure II-1. The national parks included in the 1974 United Nations List[37] are classified by biotic provinces in the right-hand column of the Figure. Based upon the Dasmann/IUCN classification system there are 48 biotic provinces in Latin America. There were 120 national parks and equivalent reserves acceptable to IUCN standards in 1974. Twelve provinces have only one area managed as a national park while 24, or one-half of the provinces, have two. The Southern Andean province has 17 samples managed as parks. And, finally, twelve provinces have no samples whatsoever which are managed as parks.

There are further criteria to consider before drawing any conclusions on the role of national parks in the maintenance of samples of the major biotic types of the region. The objective states that the sample to be maintained must comprise a functioning ecosystem and be dedicated for perpetuity.

An ECOSYSTEM (biogeocoenoses) is basically a "biotic community" interacting with its physical environment....

> Ecosystems are functioning entities composed of plants, animals, micro-organisms, and inorganic substrate of soil, rock or water, and with access, direct or indirect, to the atmosphere and to sunlight as a source of energy. Terrestrial and freshwater ecosystems exist always within a particular climate provided by the interaction of sunlight and atmosphere, and terrestrial ecosystems require a source of water. All parts within an ecosystem interact with one another, either in an immediate sense or over the long term.[38]



Region or Sub-region	Biotic Province	Number of Parks in each Biotic Province, 19
Nearctic	1. Aleutians	5
	2. Canadian tundra	3
	3. Greenland	0
	4. Canadian taiga	25
	5. Sitkan	3
	6. Oregonian	2
	7. Austroriparian	4
	8. Eastern forest	4
	9. Californian	1
	10. California Islands	1
	11. Alaskan highlands	8
	12. Rocky Mountains	36
	13. Sierra-Cascade	9
	14. Sierra Madre	7
	15. Grasslands	10
	16. Great Basin	6
	17. Sonoran	10
	18. Chihuahuan	7
	19. Tamaulipan	1
Middle American Sub-Region	20. Campeche	1
	21. Carib-Pacific	6
	22. Sinaloan	0
	23. Guerreran	3
	24. Yucatan	0
	25. Central Cordilleran	1
West Indian Sub-Region	26. Bermuda	0
	27. Everglades	4
	28. Bahamas	1
	29. Cuba	4
	30. Jamaica	0
	31. Hispaniola	1
	32. Puerto Rico	0
	33. Lesser Antilles	2
Neotropical	34. Panama	2
	SOUTH AMERICA	
Neotropical	1. Amazonian	13
	2. Colombian coast	0
	3. Bahian coast	3
	4. Venezuelan deciduous forest	5
	5. Brazilian deciduous forest	2
	6. Caatinga	1
	7. Gran Chaco	5
	8. Venezuelan dry forest	3
	9. Ecuadorian dry forest	0
	10. Brazilian Araucarian forest	4
	11. Chilean Araucarian forest	1
	12. Chilean temperate rain forest	11
	13. Chilean sclerophyll	2
	14. Llanos	0
	15. Campos	7
	16. Pampas	5
	17. Argentinian thorn scrub	0
	18. Patagonia	5
	19. Peruvian desert	0
	20. Atacama	0
	21. Guyana highlands	2
	22. Northern Andes	1
	23. Southern Andes	17
	24. Puna	2
	25. Andean cloud forest	1
	26. Juan Fernandez	1
	27. Falkland Islands	1
	28. Galapagos Islands	1

Figure II-1. The Biotic Provinces of Latin America showing the number of national parks in each province.

Source: IUCN. Biotic Provinces of the World. IUCN Occasional Paper No. 9. Morges. 1974.

An ecosystem is considered to be complete when all of its COMPONENT PARTS are present in the appropriate relationships with the environment and each other. It is clear that the SHAPE and SIZE of the area to be maintained are of direct importance to the long-term viability of the ecosystem. (See Table II-2.) The INTERNAL LAND USE of the area, such as for recreation or research, will have direct bearing on the ability of the area to sustain a functioning ecosystem. And, the EXTERNAL INFLUENCES of the adjacent lands upon the maintained ecosystem are crucial. Just as neighboring ecosystems are interdependent, so will a national park be interdependent ecologically with the surrounding landscape. The flow of surface and ground water, the migration of species, weather and climatic patterns and the many forms of man-caused pollution are among the many influences which affect the self-regulatory abilities of an ecosystem.

The final provision of the objective is that the representative sample be maintained as a functioning ecosystem in PERPETUITY. Given that the technical aspects such as size, shape, component parts, internal and external influences will permit that an ecosystem will remain viable, there remain the political and social aspects which in the long run are perhaps among the most significant of the factors. Perpetual dedication of an area to national park status requires strong POLITICAL COMMITMENT AND DECISION. The government of a country must be informed and convinced of the importance and necessity of national parks. Measures must have been taken to establish and manage such areas on a continuing basis with personnel and funds. Behind this factor lies SOCIAL COMMITMENT AND DECISION. The people must be aware and informed about the relevance of national parks to their environment, livelihood, heritage, and future, and they must be prepared to support park management and respect park management practices.

Several conclusions can be drawn concerning the role of national parks in maintaining representative natural areas. One-third of Latin America's biotic provinces do not have representative areas under national park management. One-quarter of the biotic provinces have only one national park. Therefore, as a minimum requirement to reach the objective, additional national parks are required in twelve biotic provinces. Another twelve provinces have only one park. Where land use is yet rapidly changing, or where the parks are small or composed of fragile ecosystems, at least one additional park should be established in each province.

There is little numerical evidence to judge the ecological integrity of the parks already in existence. However, it is clear from the resolutions and recommendations of the meetings of CLAPN, FAO/LAFC and the First World Conference on National Parks, that there is concern about the lack of ecological integrity of many parks around the region. Personal observation will confirm that upstream catchments lie outside the boundaries of many parks. The hydrological regimes are often cut, leaving water supplies or drainages for estuaries, coastal lands and swamps, outside of the parks. Many animal species migrate outside of the protected areas or do not find all of their habitat requirements within the parks.

TABLE II-2

SIZE OF NATIONAL PARKS IN LATIN AMERICA

Size Class in Hectares	Number of Parks in Size Class	Percent of Total National Parks in Size Class
<1,000	2*	.018
1,000-9,999	42	.350
10,000-49,999	36	.300
50,000-199,999	20	.167
200,000-499,999	9	.075
500,000-999,999	7	.058
>1,000,000	4	.033
TOTALS	120	1.00

Source: IUCN. 1974 United Nations List of National Parks and Equivalent Reserves, Morges, Switzerland.

* Includes small islands.

The size of most parks in Latin America is small for the maintenance of self-regulating ecosystems. Fifty-three percent of the parks are under 10,000 hectares in size. Eighty-three percent are under 50,000 hectares. Only some 16 percent are 200,000 hectares or larger. Were the majority of these small parks to be surrounded by intensive agriculture, urban or industrial development, there would be serious doubt about the viability of these ecosystems. Fortunately, most parks are little used for direct visitation as yet, and conflicts among internal uses are minimal.[39] Thus, park managers will still have time to organize their park programs before the arrival of intensive pressures experienced elsewhere.

The external influences are challenging to most parks. In common around the region are poaching of animals, timber and plant materials, pressures and interference from tourism and the related physical developments, highway development, invasion by landless settlers, and attempts to extract natural resources.[40] Most parks have remained relatively free from the direct negative effects of such pressures. However, of greatest concern is the interrelationship between the parks and surrounding land uses. Fire, pesticides and land clearing are commonly found at the immediate boundary of parks and little attention has been given to coordinating management activities with adjacent land users.

The factor of perpetuity is fragile and perhaps utopian. It depends upon stability of land use, long-term planning, broad dissemination of information, conservation education in the schools, and a sensitive and responsive political system. With few exceptions, however, every established park in virtually every country of the region, has survived the changes resulting from economic development, revolution, agrarian reform and colonization, and population growth.[41] In spite of the general lack of governmental and public awareness concerning the relevance of national parks to the development and conservation of the human habitat, the Latin American experience to date demonstrates reasonable political and social support for parks. This is especially noteworthy when placed into the relative context of other national development priorities for basic human needs.

However, the past record on the longevity and continuity of parks is not necessarily a basis upon which to predict the future. The fact that existing parks have not been declassified may reflect merely the lack of competition for the particular lands and natural resources, and for the small budgets allocated for park management. Mounting pressures for land and financial resources will challenge park management and major efforts will be required to maintain representative samples of the nation's biotic provinces in their natural state, in perpetuity.

Maintain Ecological Diversity and Environmental Regulation

It is not sufficient to maintain representative samples of each biotic type. Within any single type there is considerable variation of plants, animals and habitats. This is particularly true in tropical areas where great biological differences can be found during a day's walk in the forests, mountains and coastal areas. The same species take on different life forms and behavior. They take on different relationships with other species and with their environment. Furthermore, there are species which live upon other species, either utilizing the host only to gain a niche or to parasitize it of energy-giving substances. In environments which have been stable for millions of years, such as the tropical rain forests and coral reefs, the diversity of biological life reaches its maximum development.

It is generally considered that the stability of ecosystems is closely related to the number of species which interact in the environment. Perhaps this concept is more accurately stated in a different way. A stable environment tends to permit the evolution of complex ecosystems.[42] While not fully understood, what is important is that some ecosystems can be disturbed and within a short time they function normally again. There are self-regulating mechanisms which give resiliency to the ecosystem. Other ecosystems become unstable after minimal disturbance and return to the original state only after long periods of time, if ever.

National parks can play an important role in ecodevelopment by approaching the problem from both ends. First, parks can be located and managed to maintain natural areas of high species diversity. In this way, not only sample representative areas of the nation are protected, but also the transition areas between them are protected. It is along such lines of transition that greatest diversity is often found. Second, parks can be located and managed to provide stability to ecosystems, with particular emphasis upon those which are of low resilience.

This role is closely related to the internal survival of the park and to the effect of the park upon the surrounding region. A stable ecosystem maintains its diversity and tends to be self-regulating. A stable ecosystem also effects the regulation of watersheds, insect populations, micro-climate, predator-prey relations and other less-understood factors. Therefore, environmental regulation is a necessary consideration if the park is to be able to meet the objectives over the long run, and if the park is to have full impact in favor of conservation and development.

Moreover, there is a dilemma: Generally, it is assumed that by their very nature parks maintain ecological diversity and environmental regulation. Yet, an inspection of many parks reveals that the objective could be better met by extending the park to cover an entire watershed, to embrace an entire habitat, or to revise the size or shape of the area. Realistically, however, it is often the case that the existing national park already includes all of the remnant wildlands.

Several examples can be examined to reveal how existing national parks relate to ecological diversity and environmental regulation. The Salamanca Island, Sierra Nevada, and Tayrona National Parks of North Central Columbia contain among them samples of life zones extending from permanent snow and glacier at peaks of approximately 5,800 meters (above sea level) down through "paramo", deciduous moist and dry forests, on to coastal formations, mangrove swamps and coral reefs. (See Figure II-2 and 3.) In this combined protected area of 83,000 ha., over 300 species of birds are found, some of which are migratory. Several endemic species of animals inhabit the area and 50 species of coral have been identified thus far. Salamanca Island and Tayrona have had written management plans since 1968.[43] The effect of the high-tower power lines across the length of Salamanca upon wildlife is unclear. Road construction caused changes in water salinity and affected the mangrove and other vegetation. In Tayrona, a paved highway was built into the park as part of a tourism development project. The highway actually crossed the scientific (primitive undisturbed) zone with large cut-and-fill engineering. The project was halted in 1974 by Presidential order.

The Manu National Park of Amazonian Peru is one of the region's most objectively designed parks in terms of diversity and environmental regulation. (See Figure II-4 and 5.) The park covers a variation in elevation from 5,000 m (asl) down to 500 m, encompassing "paramo" to tropical rain forest. Some of the areas of richest biological diversity, such as the oxbow lakes and stream-edge areas have been carefully included well into the interior of the park. And, the upstream catchments of practically all streams which traverse the park have been included within the park boundary. This design provides important insurance for internal ecological regulation, and in addition, offers to the region downstream beyond the park some stability of water regime.

The 10,000 hectare Santa Rosa National Park of Costa Rica contains tropical savannah, tropical dry forest and various coastal formations. (See Figures II-6 and 7.) The park was carefully designed to include the rich ecotones between savannah and forest, as well as between the estuaries and other coastal formations. The key stream catchments which regulate the estuaries of the park are included within the boundaries. The estuary and beach environments provide the ecological context for the nesting of thousands of marine turtles each year. Until the Southwestern corner of the park was purchased in 1977, the estuaries and lowland forest areas were endangered by timber harvesting and fire. Cattle from adjacent properties continued to graze freely in the park until 1977 regulations permitted their removal.

Six of Argentina's national parks are located along the eastern slope of the Andes mountains. (See Figures II-8 and 9.) These parks contain samples of the great ecological diversity which extends both latitudinally and altitudinally in the Argentine Patagonia. The northern parks cover from snow and glacier down to desert. Further south, the parks run down to semi-arid grasslands. In the south, the parks run from permanent ice fields down to the Nothofagus forests. In addition, the parks contain the headwaters of several of the nation's important rivers. While several of these parks lie within the single "Southern Andean biotic province", they should not be considered as repetitious. Taken together, these parks embrace much of the ecological diversity of the eastern slope of the Andeas mountains.

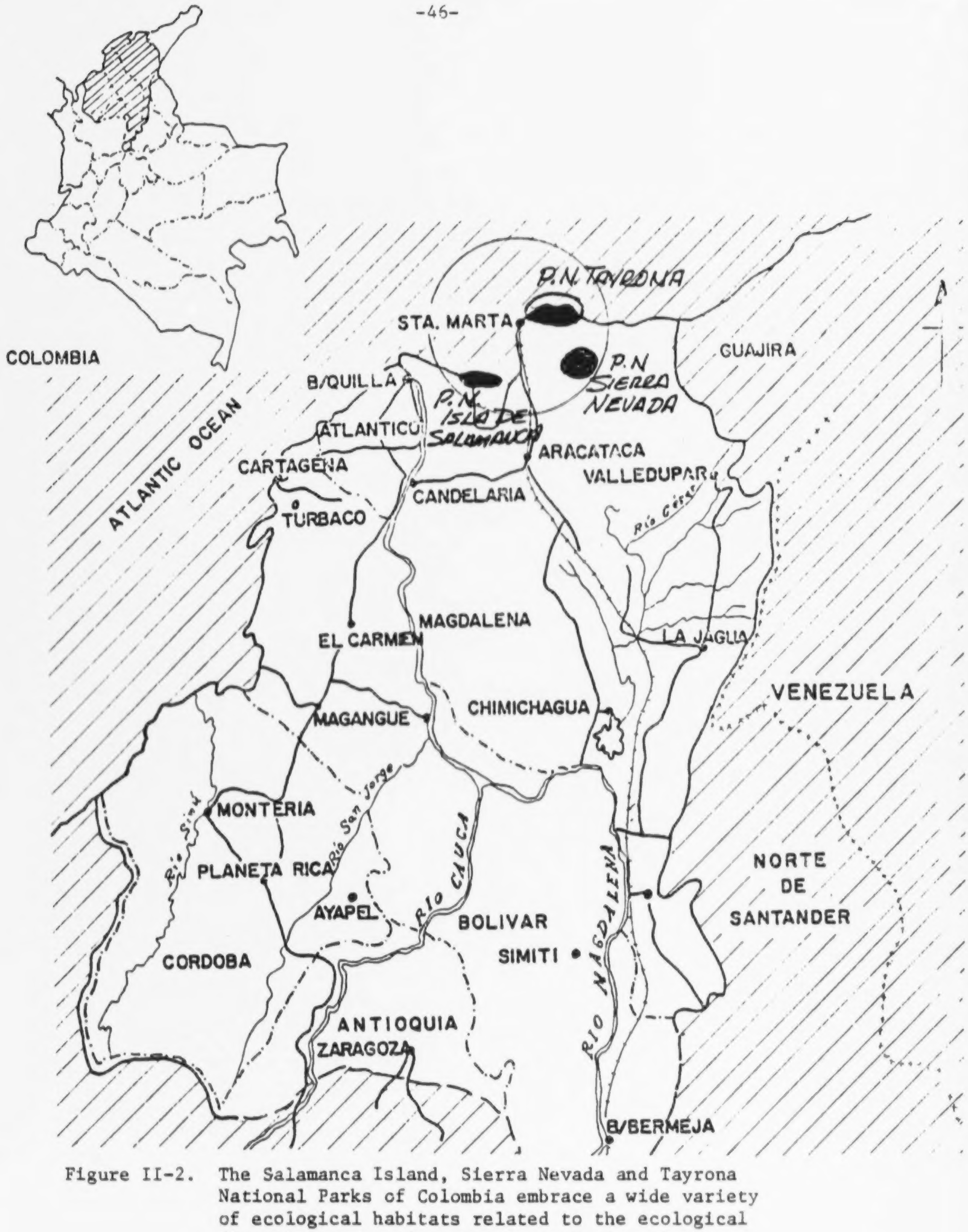


Figure II-2. The Salamanca Island, Sierra Nevada and Tayrona National Parks of Colombia embrace a wide variety of ecological habitats related to the ecological diversity and environmental regulation of the Northeast region of the country.

Figure II-3. The three parks of Northern Colombia contain representative samples of the glaciers and "paramo" surrounding Pico Bolivar at 5,800 m in Sierra Nevada National Park (above). The forests extend downward to the Caribbean coast in Tayrona National Park (middle). And, at the delta of the Magdelena River in Salamanca Island National Park, mangrove forests provide a rich habitat for birds, reptiles, fish and mollusks (below).

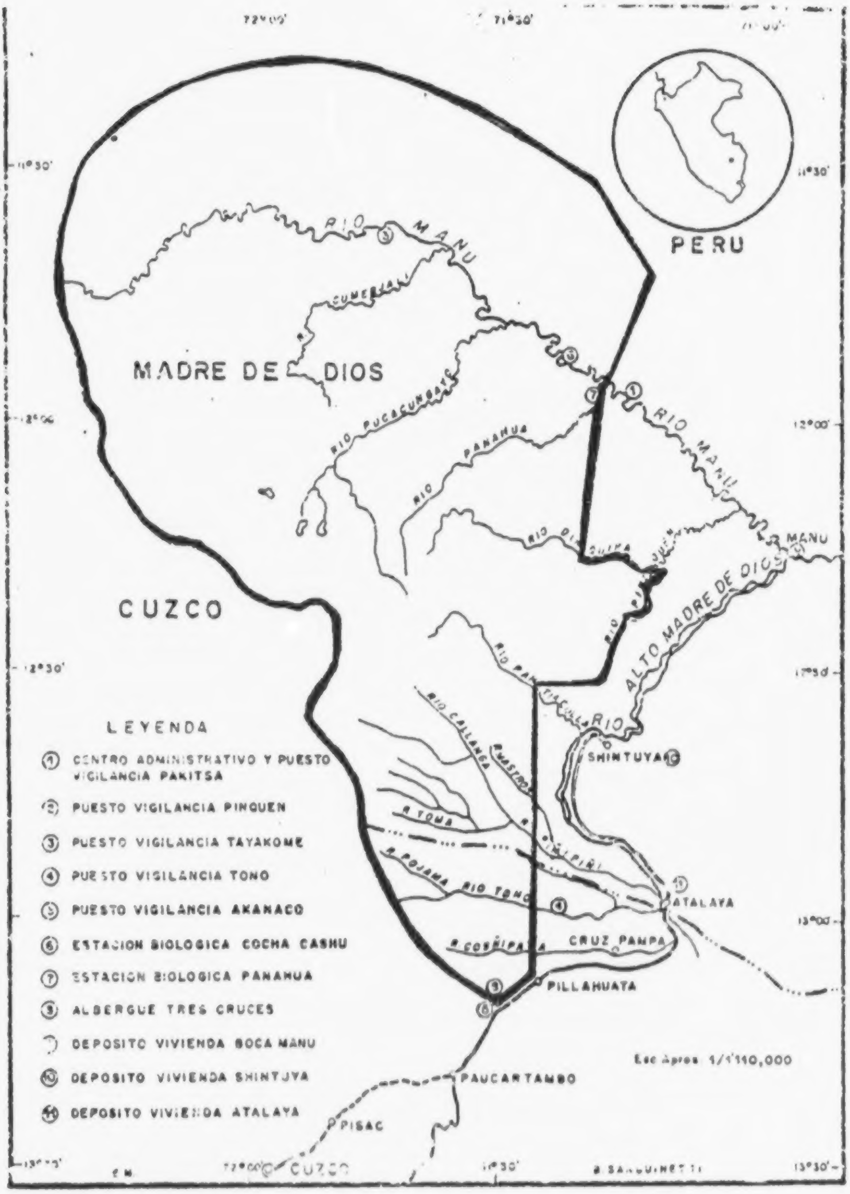


Figure II-4. The Manu National Park in the Amazon region of Peru includes an outstanding range of ecological zones, the headwaters of the streams which influence the park and the ecologically diverse ox-bow lakes.

Figure II-5. The Manu National Park of Peru offers an unbroken transect of diverse forest types from "paramo" and high-altitude forest down to rain forest and riverine formations.

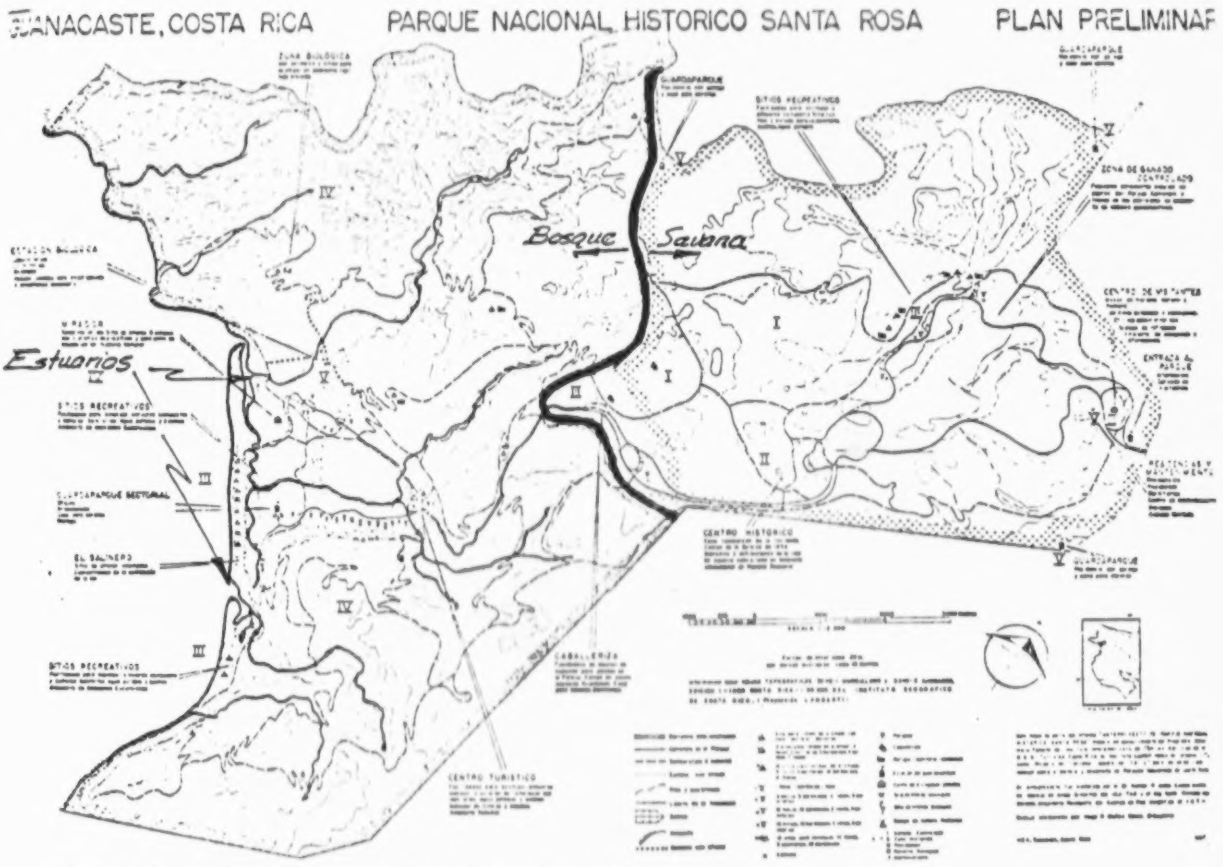


Figure II-6. The Santa Rosa National Park of Costa Rica maintains the ecological transition zones between forest and savannah, and also covers the watershed catchments upon which the coastal estuarine habitats depend for fresh water.

Figure II-7. The savannah-forest environment (above) and the lowland forest-estuarine environment (below) offer a diversity of habitats for plant and animal life in the Santa Rosa National Park of Costa Rica.

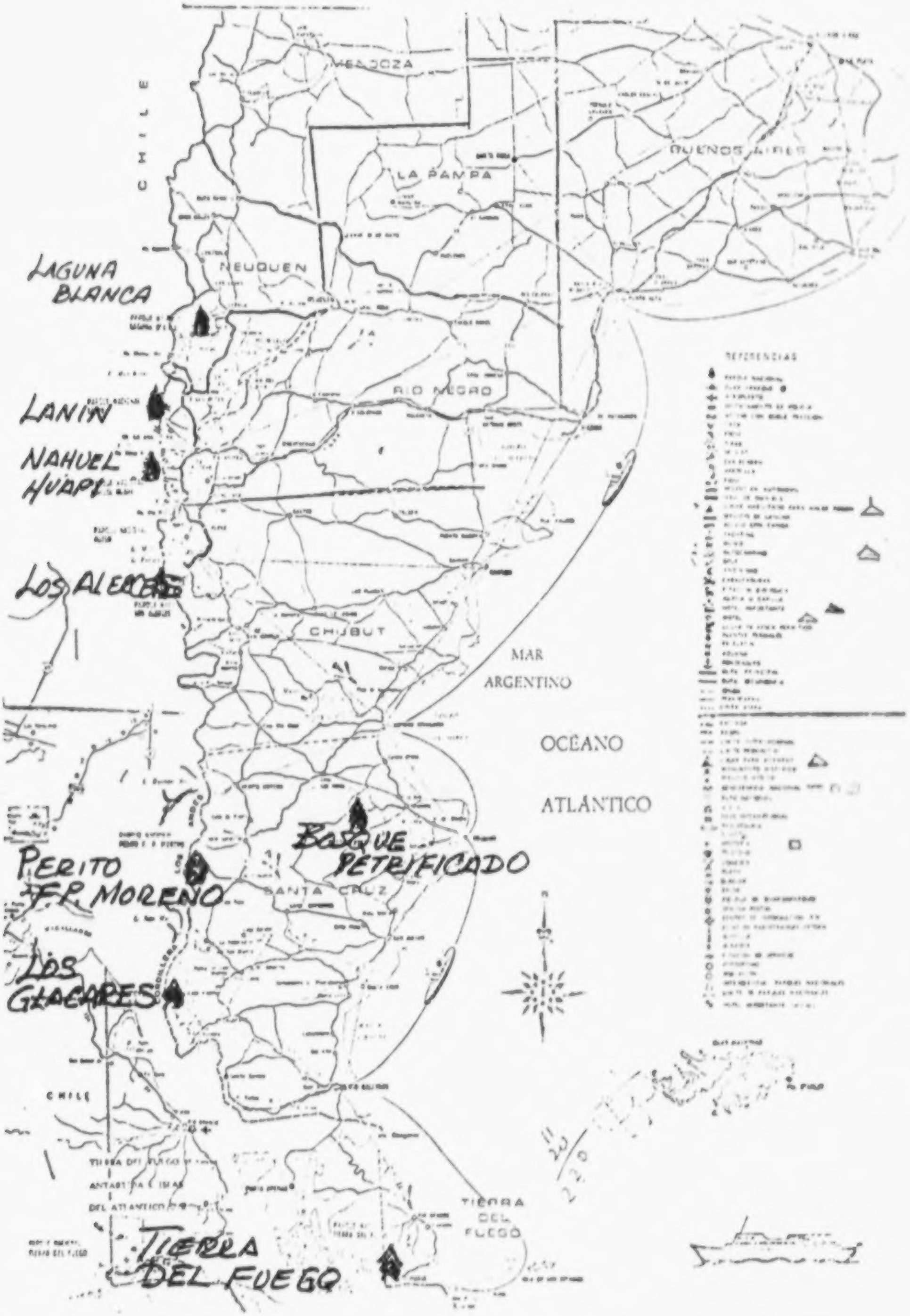


Figure II-8. The National Parks of Patagonia Argentina maintain samples of the ecological diversity of this region of the Andes, including permanent ice fields, glaciers, desert, grasslands and forests.

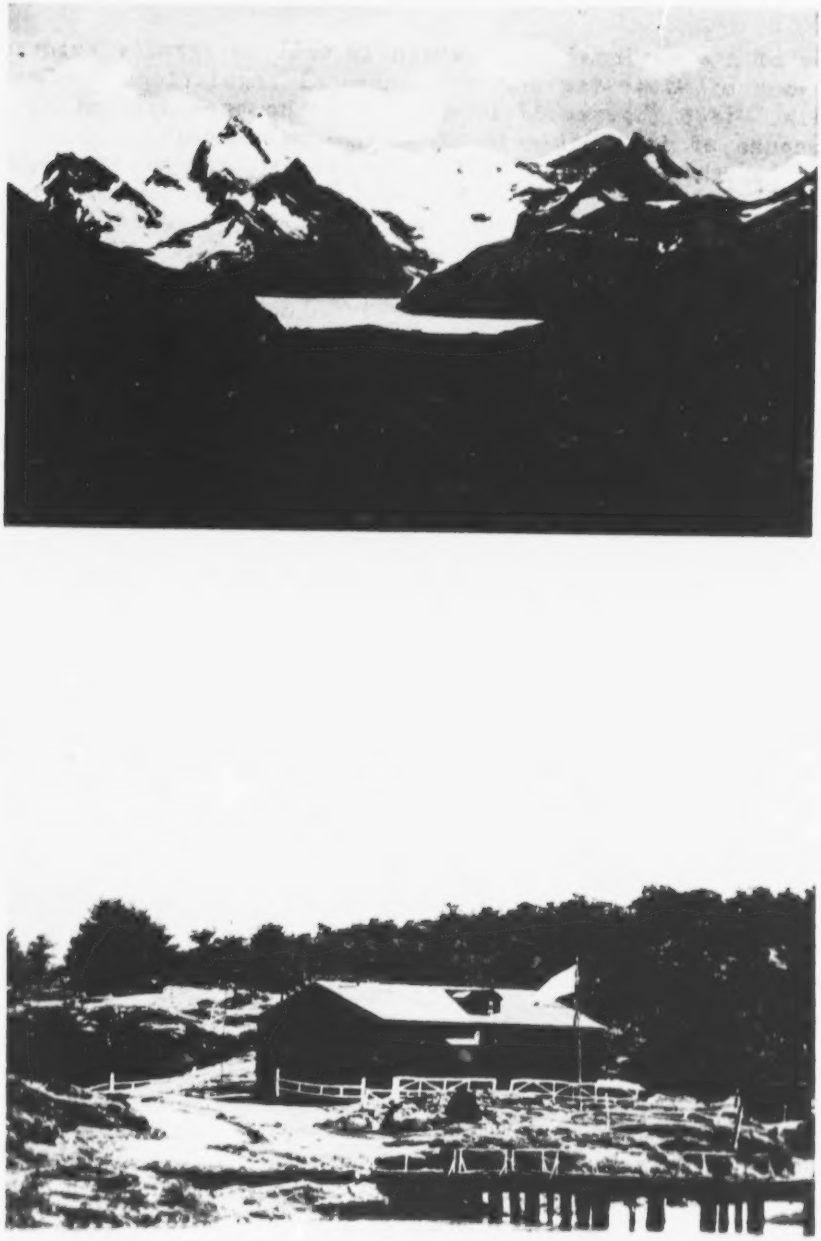


Figure II-9. Glaciers drop from permanent ice fields in Glaciers National Park, Argentina, down into the grassland environment semi-arid of Santa Cruz province (above). Further south, Nothofagus forest extends from snowline to the sea in Tierra del Fuego National Park (below).

One of the national parks which is most integrally related to the maintenance of diversity and environmental regulations is Canaima in Venezuela. (See Figures II-10 and 11.) The park was established in 1962 because of its intrinsic biological and scenic values including Angel Falls, the world's highest waterfall at 1,000 meters (3,212 feet). There was little doubt in the minds of the planners of the Venezuelan Guayana Corporation (CVG), the professionals of the Ministry of Agriculture and Livestock (MAC), and the national political leaders that the protection of the upper Caroni watershed was vital to the development of the then mushrooming Ciudad Guyana industrial complex.[44] The supply of constant and inexpensive electricity was to be derived from the Guri Dam on the Caroni, reaching an output of 2,650,000 kilowatt-hours in 1977 and is scheduled to produce 9,000,000 following the second stage of construction which will raise the height of the reservoir to 270 m.[45] In recognition of the importance of providing adequate management for the major portions of the upper Caroni watershed, it was recommended in 1974[46] that the park be amplified from one million to three million ha.

Several conclusions can be drawn on the role of national parks in the maintenance of ecological diversity and environmental regulation. Historically, park managers in Latin America have been particularly sensitive to the ecological aspects of nature conservation. Most parks have been layed out to include a range of life zones, transition zones, and samples of areas where land and water interact. In those national parks which were selected and established by ecologically-minded and experienced park managers, the diversity and regulatory factors were generally taken into account. Emphasis was also given to these factors where there was hydrological development.

The major problem lies in the fact that the transition zones are not only places of high ecological diversity, but also favorite sites for physical development. As will be discussed in Chapter III, roads, recreation sites and other facilities are often placed along the margins between forest and savannah, along the narrow strips of land where water meets land, and at maximum tree line in mountain lands. The impact of development at key transition zones may offset the ability of some parks to maintain ecological diversity and environmental regulation.

Maintain Genetic Resources[47]

During the three billion years of development of Planet Earth, millions of species have evolved. Scientists predict that there are approximately 10 million species currently alive. Species represent one of humankind's most valuable materials as represented in the contributions they make to agriculture, medicines and pharmaceuticals. However, because of changing land use and the disruption of wild habitats, many hundreds and thousands of wild plants and animals face extinction in the near future. In fact, scientists calculate that some one million species will be eliminated by human activities by the year 2000. The rate of extinction appears already to be up to one species per day, and is expected to reach one per hour by the end of the century.[48]

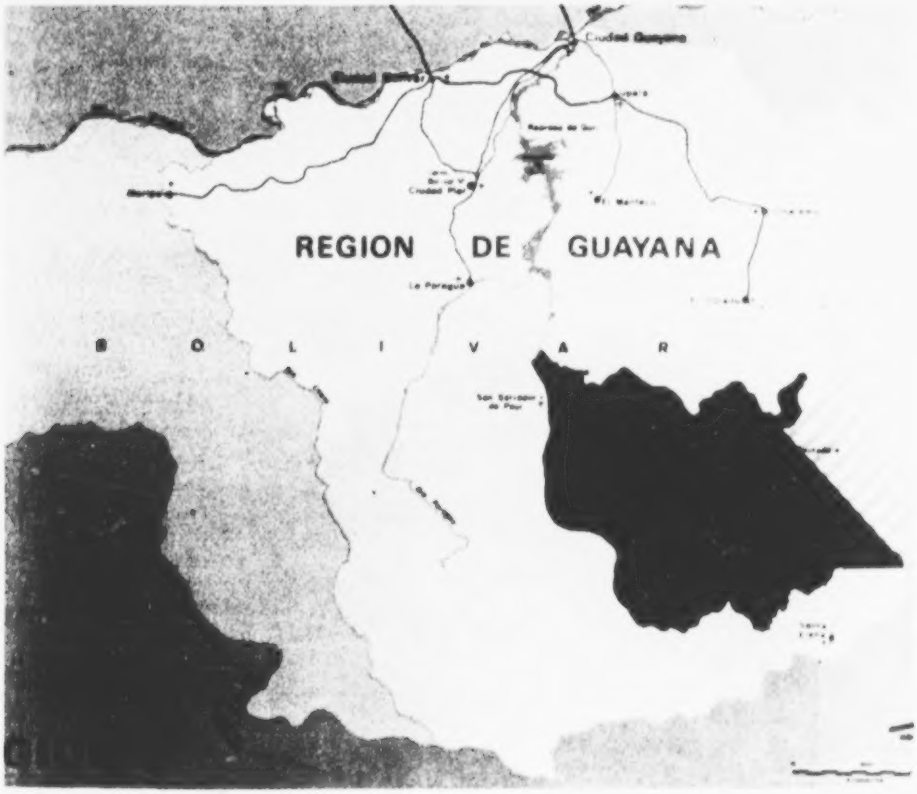


Figure II-10. The Canaima National Park of Venezuela has a major role in the maintenance of the ecological diversity and the environmental regulation of the upper Caroni river basin. The nation's industrial growth and urban population depend for much of their hydroelectric energy upon this river.

Figure II-11. The diversity of savannah and riverine forests is exaggerated by massive mesas of sandstone and quartizite underlain with intrusive diabase rocks in the Canaima National Park in Venezuela.

This is an issue of major consequence to humankind and it is the result of many factors. Problems of land tenure, food shortages to poor families, and a series of social, economic and political injustices force millions of Latin Americans to scour the forests and mountain sides in search of survival. The introduction of modern strains of grains and livestock stimulate farmers to convert to improved varieties and to abandon unwittingly the wild and primitive forms. As demands for beef, coffee, cacao, bananas, sugar and other industrial crops increase, forests and grasslands are converted to pasture and agriculture.

There is little question that humans will continue to convert wildlands to other land uses in an effort to meet utilitarian requirements. From wild plants and animals have come algesics, antibiotics, cardio-active drugs, anti-leukaemic agents, enzymes, hormones and anticoagulants. Alkaloids of many types as well as such industrial commodities as gums, latex, camphor, resins, dyes, oils and rubber are being derived from substances found in the tropical forests. Many research projects currently underway in wild areas are searching for a cure to cancer and sources of economical energy from vegetable materials.

Agricultural plant crops require constant programs of breeding to keep ahead of insect pests and diseases. Maize, wheat, rice and sorghum produce one-half of the world's food supply. Yet the wild and primitive forms of maize are rapidly being eliminated in Mexico, Colombia and Bolivia. Similarly, the wild and primitive forms of other grains also are being lost in Asia and Africa. Current varieties of the grains which feed the bulk of the world human population have been bred for narrow ranges of climatic factors. Thus, if current indications are correct, the world is entering a cooler era with greater variations and extremes of climate. There will be a need to alter the varieties of grains being utilized.

Why not simply collect the wild and primitive genetic materials, place them in an envelope and keep them easily accessible in a refrigerator? This is being done for many grains, but it is only a partial answer. To collect and store genetic materials would presume that humans know what they want from the wildlands. Unfortunately, this is not the case. Six out of seven plants and animals have yet to be named and described to science. Their characteristics and properties have yet to be studied. It is difficult, if not impossible, to identify genetic traits from the observation of physical properties and vice-versa. This is critical since what needs to be conserved wherever possible is the living species and it variation. The challenge is not to protect individuals but gene pools. Since individual species are parts of communities, which relate to ecosystems that are tied together by natural processes, the question of the maintenance of genetic resources comes down to the management of wildlands.

One further complication: The key to maintaining genetic resources lies not merely in protecting areas, but in ensuring the stability of ecological systems in those areas. Whether natural communities are complex, such as in the tropical moist forests, or simple, such as in the grasslands, the diversity of species and the variation within species depends upon stability of the environment. Any disruptions in the environment will cause disorder in the interrelationships among species and between them and their environment.

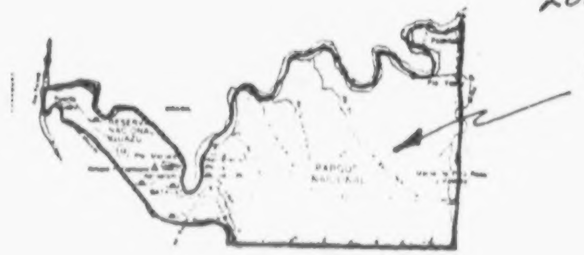
So, in addition to the maintenance of representative samples of the nation's biotic provinces, and the maintenance of the nation's natural diversity and environmental regulation, this objective concerning genetic resources points out the need to choose those areas for conservation management which will protect species of importance to humankind's current and potential requirements. Implicit in this objective is the importance of maintaining stability within protected areas.

Some national parks of Latin America have given particular emphasis to the maintenance of large sectors in an undisturbed state. A prime example is the Iguazu National Park of Argentina. (See Figures II-12 and 13.) Of 75,820 ha, approximately 40,000 ha are managed as a zone for scientific purposes. Tourism and recreation are totally excluded. One-third of the park personnel are assigned to protect this zone. In contrast, up to 10,000 visitors per day observe the Iguazu Falls in another sector of the park.

Similarly, several national parks in Argentina, Chile, Colombia, Costa Rica, Cuba, Ecuador, Peru and Surinam have been planned and managed to maintain sectors where human activities are severely restricted. As of the mid 1970's, Brazil and other Amazonian countries are placing major emphasis upon the role of parks in genetic conservation. To the extent that size and population densities permit, the parks under planning and development in Central America and Panama are also providing for such limited use areas.

In conclusion, national parks provide a method for conserving genetic resources. Where restricted-use sectors are established within parks to limit human activity severely, the necessary stability for maintaining genetic resources can be provided. Parks in Latin America are being managed to provide such protection and stability. However, the construction of roads and the initial phases of a tourism complex in the scientific zone of Tayrona National Park (Colombia)[49] raises the question of just how well restrictions on human use can hold up in the face of other development pressures. The fact that construction of the tourism complex was haulted by presidential executive order when the facts about the role of the area were explained does provide some reason for optimism.

One concern is to ensure the survival of genetic materials in the existing national parks. Another, is to ensure that the plants and animals of greatest potential importance to humankind are provided adequate protection and the opportunity to continue to evolve. New national parks and other wildland categories must be established in locations where such genetic resources exist. This is particularly true of the tropical moist forests and marine areas. The major program underway in Amazonian countries, and particularly in Brazil, will be presented in Chapters VI, XI and XII. Work on the protection of marine



Zona Intangible
para uso
científico

Figure II-12. The Iguazu National Park of Argentina includes a scientific zone where human activity is severely restricted. This zone is managed to maintain, to the extent possible, the genetic resources of the humid sub-tropical region of the nation.

Figure II-13. The major feature of managing the scientific zone of Argentina's Iguazu National Park is the maintenance of stability in the environment. In this way, the park is contributing to eco-development by maintaining stocks of genetic resources for pharmeceutical, agricultural and industrial requirements.

areas is being included within the activities of park departments in spite of some critical problems related to jurisdiction and management capabilities. The Galapagos Islands (Ecuador), Paracas (Peru), Cahuita (Costa Rica) and Tayrona (Colombia) are particular examples where the national park category is being applied to marine resources.[50]

Maintain Objects, Structures and Sites of Cultural Heritage

The cultural heritage of Latin America is managed under various types of institutions including museums, anthropological institutes, and ministerial departments. Cooperative efforts have been initiated recently between cultural and natural resource agencies in response to the growing need for integral protection, management and development of wildlands where cultural values are also present. Increasing tourism to these sites as well as land-use pressures for adjacent and surrounding lands have greatly supported this need. While national parks have been, and continue to be concerned primarily with the management of natural areas, there is a growing relationship between natural and cultural heritage.

Cultural values are found as objects, structures or sites. The objects are normally housed in museums or other modern facilities to ensure adequate protection including climatic control. Latin America is rich in cultural values which occur as structures from pre-Colombian and colonial periods. Religious monoliths, remains of villages, food storage and sport facilities remain from the Aztec, Maya, Inca and other indigenous groups. Spanish and Portuguese colonial homes and churches are to be found. And perhaps most spectacular, entire villages, fortresses and religious centers of pre-Colombian cultures are being restored. Entire plazas of colonial cities remain. In addition, there are historic sites where key historical events took place which had effects upon the region and even the world. These areas are often called "memorials" since these sites commemorate the place of the event in the absence of physical structures or remains.

From the point of view of wildland management two general approaches to cultural resources can be identified: First, where archeological or historical objects, structures or sites lie within urbanized regions, or where the objects of value lie within heavily modified landscapes, such resources are generally managed by cultural institutions in direct collaboration with museums, engineering and public works departments and municipal planning boards. These cultural values have little relationship with wildland management. Second, where the objects, structures or sites lie within natural landscapes where the natural resources possess high intrinsic value apart from the cultural motifs, or where the surrounding areas must be maintained in a natural state to conserve the scientific and scenic integrity and functional control of the cultural motif, such resources can be advantageously managed directly by the natural resource institutions or cooperatively by the natural and resource cultural departments. In this latter case, working agreements are generally made with the cultural institutions to study, plan and develop the cultural elements of the conservation unit cooperatively.

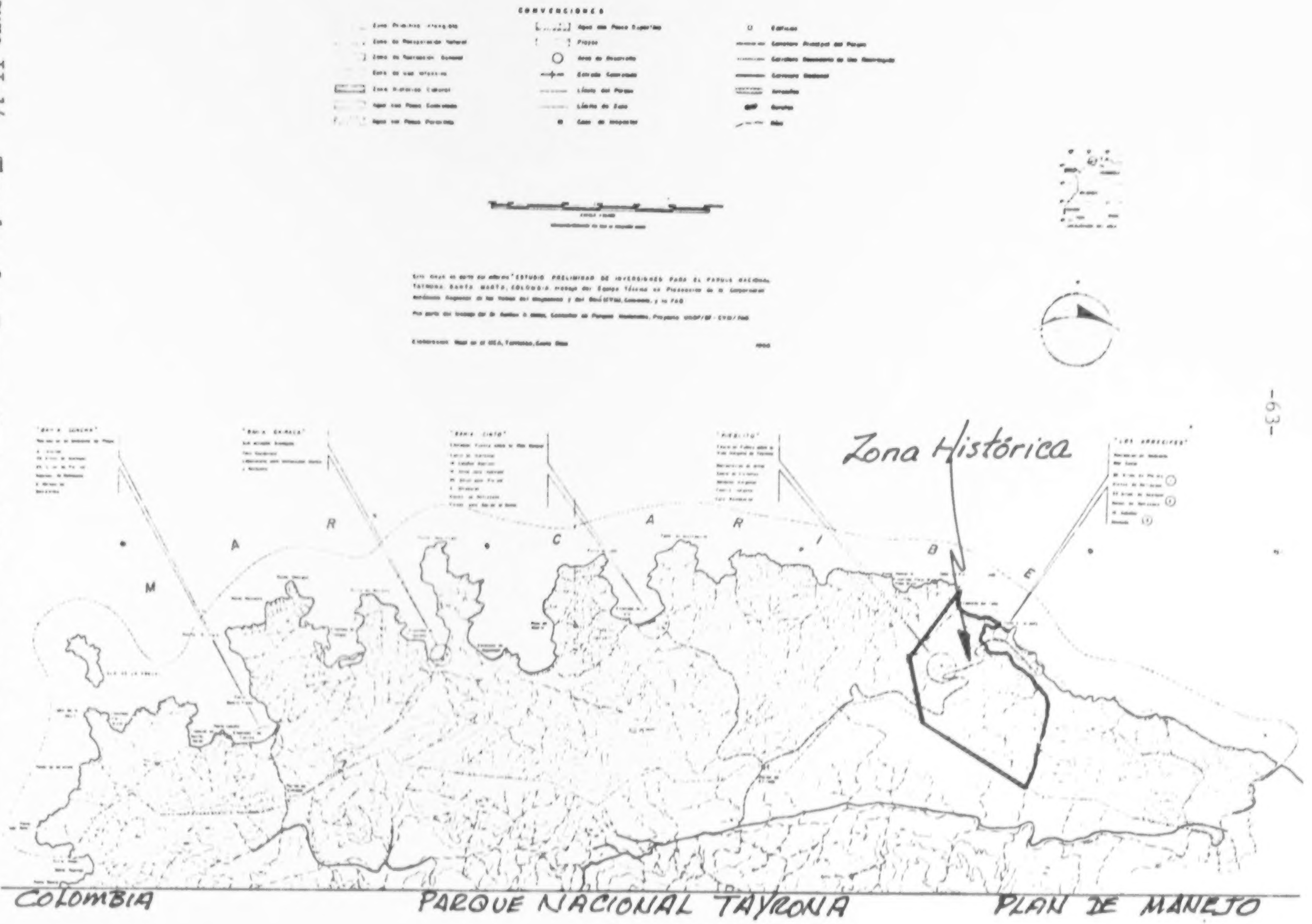
Examples of cultural monuments in non-wildlands include such extensive areas as Teotehuacán near Mexico City and Sacsehuamán Fort near Cuzco, Peru. Within every country there are cultural structures in urban centers including the colonial churches in the plaza at Cuzco, Peru, early government buildings in Bogota, and the homes, birth, death or meeting places of patriots such as those in Asuncion, Paraguay, La Paz, Bolivia and Santa Marta, Colombia. Most capital cities have erected monuments to commemorate independence and other important events. These monuments are often elements within urban parks containing gardens, sports areas and zoos.

Pre-colonial and colonial cultural heritage are being rapidly lost in the process of urban development and renewal. Great courage and foresight have been exhibited by the leaders and planning authorities of Antigua (Guatemala), Cusco (Peru), Quito (Ecuador), Ouro Prieto (Minas Gerais, Brazil), Popayan (Colombia) and Santiago de Cuba (Cuba) among others, for the integral restoration of main areas. The architectural style of these towns and cities has been regulated and controlled to maintain these design characteristics and atmosphere. While life and work within many of the buildings is contemporary and even modern, the external environs related back to historic periods of great importance to the locale, nation and Latin America.

Tayrona National Park in Colombia provides an example where cultural values are found within natural areas. (See Figures II-14 and 15.) The Pueblito Archeological Site embraces the remains of the village of coastal Tayrona Amerindians at the time of the Spanish Conquest. In the mid-1960's when park planning at Tayrona was initiated, the planners noted that the site was being looted by illegal traffic in pre-Colombian artifacts including objects made from precious minerals. The landscape surrounding the site was being destroyed in the process by digging, burning and migratory agriculture in support of the looters. The management plan for the park[51] recognized the importance of the indigenous culture as part of Colombia's heritage, and the interrelationship between the cultural structures and the surrounding landscape. The plan called for the incorporation of the archeological site into the national park. The National Park Division of the Institute for the Development of Natural Resources (Inderena) zoned that portion of the park to give primary attention to archeological research, reconstruction and interpretation to visitors.

The initial attraction of Costa Rica's Santa Rosa National Park was the old hacienda buildings. The structure and surrounding lands had historical value as the decisive battleground where the Costa Rican volunteer army turned back Filibuster privateers in 1856. (See Figures II-16 and 17.) Investigation of the site and surrounding lands during 1967 and 1968 revealed the existence of tropical dry forests and biologically rich coastal and aquatic communities. In 1969, the integral cultural-natural park was proposed and established,[52] and was placed under the authority of the National Park Service of the Ministry of Agriculture.

Figure II-14. The plan for Tayrona National Park of Colombia provides a special historic zone for the remains of the Tayrona Indian settlement. The remains were previously managed as Pueblito Archeological Monument which did not provide the necessary protection of the site.



COLOMBIA PARQUE NACIONAL TAYRONA PLAN DE MANEJO

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Figure II-15. The Tayrona Indians defended their coastal settlements against the conquering Spaniards for over 100 years. In 1966, the park planning team included the ruins within the study area for Tayrona National Park (above). By 1974, major segments of the settlement had been restored through cooperative efforts of the parks and archeology institutions (below).

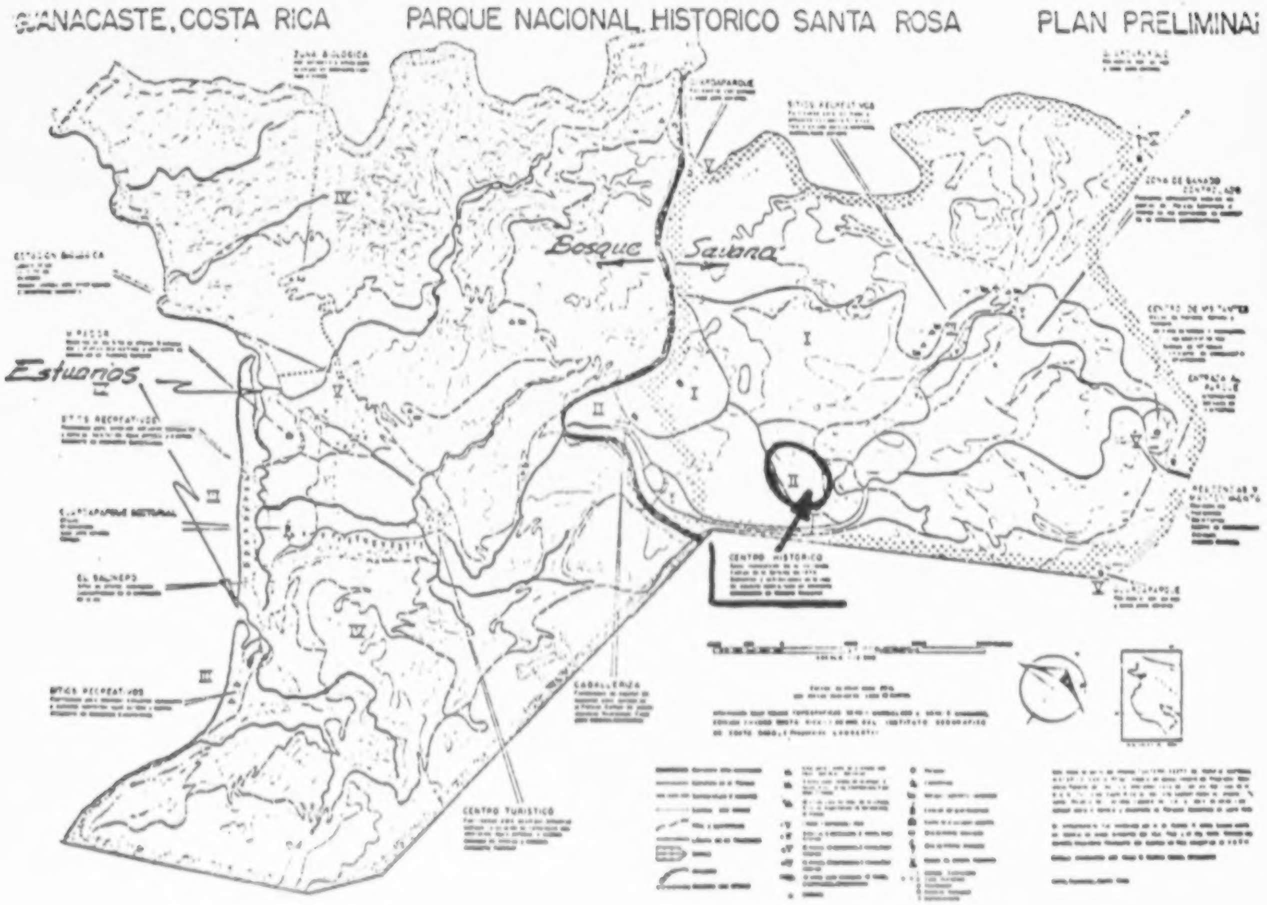


Figure II-16. The plan for Santa Rosa National Park in Costa Rica incorporates the historical and natural resources into one, integrated approach to the management and development of the area.

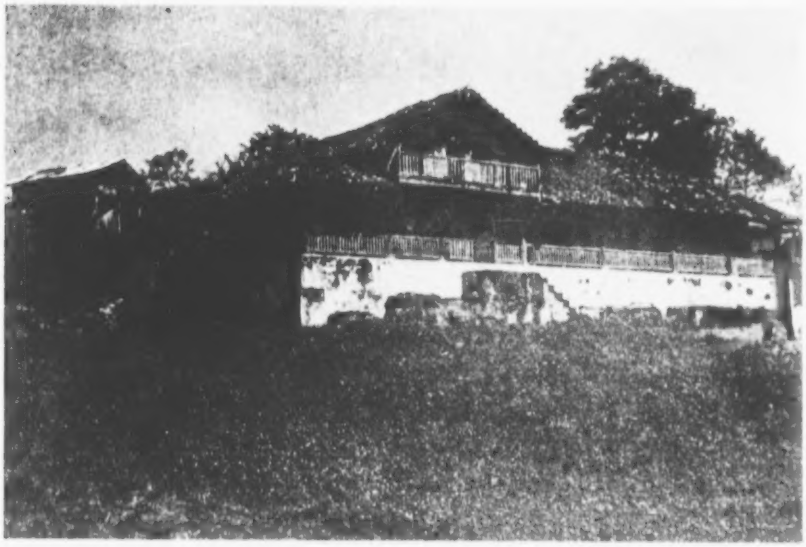


Figure II-17. The historic hacienda of Santa Rosa National Park in Costa Rica with its surrounding corrals, savannahs and forests formed the setting for decisive battle for the liberation of Central America against the invading Filibusters (above). The area also includes important coastal and estuarine habitats (below).

The "Rapa Nui" (Easter Island) National Park of Chile was established in 1968 with 4,589 hectares. (See Figures II-18 and 19.) The island is the home for some 1,000 resident Easter Islanders (Pascuenses), and some 500 residents from the mainland. In addition to the well known monoliths and structures, the island is dotted with agricultural activities, livestock grazing, orchards and traditional fishing sites. In an effort to formulate a harmonious approach to the conservation of cultural values and the development of opportunities for the Islanders and the nation, a team was sent in 1974 to prepare a plan which would integrate the many facets of conservation and development. The management plan called for the study, restoration, protection and interpretation of the cultural objects as integral elements of the landscape and in association with the polynesian decendents.[53] While the park embraces most of the island territory, the town of Hanga Roa, and agricultural and grazing areas are excluded and remain under the management of the relevant institutions. Various traditional uses of the park area by the Islanders are respected in the plan. And, the economic and social welfare of the Islanders is given priority. The park is managed by the Conservation Department of Chile's National Forestry Corporation (CONAF).

Three major sites of New-World cultural heritage -- Tikal, Portobelo and Machu Picchu -- are currently in phases of transition from the status of traditional archeological monuments to national parks or other wildland categories. The change implies that surrounding landscapes and their interrelationships with past cultural practices are recognized and included in the management and development programs. The 57,600 hectare Tikal National Park was established in 1957. The management and development of the spectacular Mayan pyramids and tropical rain forest setting were planned on an integral basis in 1971.[54] (See Figures II-20 and 21.) The responsibility for the management of the park lies within the Institute of Anthropology and History. Cooperative activities with the Guatemalan Tourism Institute and the Guatemalan Forestry Institute are leading to the training of personnel and the protection and management of the extensive area.

The history of Spanish colonization of the New World is intimately linked with the Isthmus of Panama. Across the narrow land bridge the precious metals of the Incan Empire were carried from (Old) Panama City on the Pacific to the fortified bay settlement of Portobelo on the Caribbean. Through cooperative efforts of the Panamanian Tourism Institute (IPAT) and the General Directorate of Renewable Natural Resources of the Ministry of Agriculture, the fortifications and various historic structures are being protected and restored together with surrounding forest lands. Plans have been proposed for the establishment, management and development of the cultural structures and sites within the surrounding forests, beach lands, marine areas and bays as one integral Portobelo National Park.[55] (See Figures II-22 and 23.) Study and exploration out into the surrounding forests and down into the waters of the marine bays and estuaries reveal remains of Amerindian objects, Spanish transport, settlement, agriculture and battle facilities, early African slavery and settlement, English pirates and the early geopolitics of the New World. Likewise, the area contains samples of natural plant and animal communities ranging from marine to

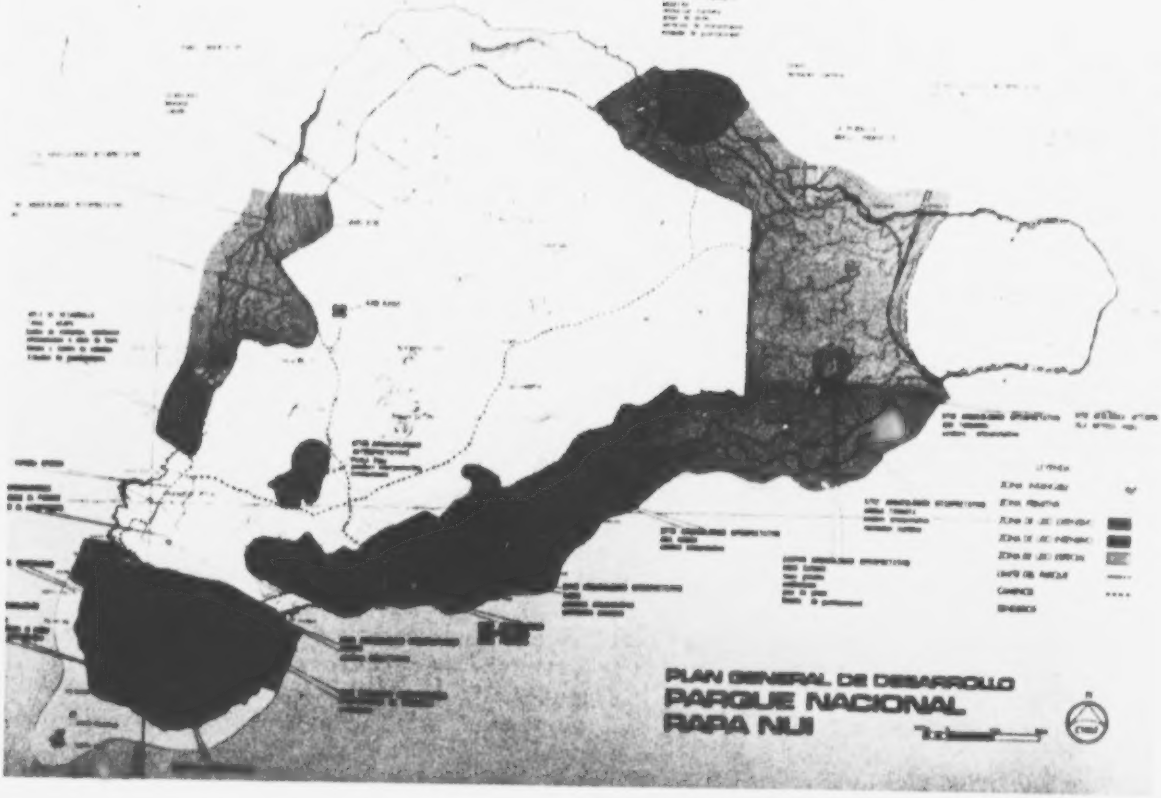


Figure II-18. The plan for Rapa Nui National Park (Easter Island) in Chile provides for the maintenance of the cultural objects, structures and sites and provides access for local traditional practices.

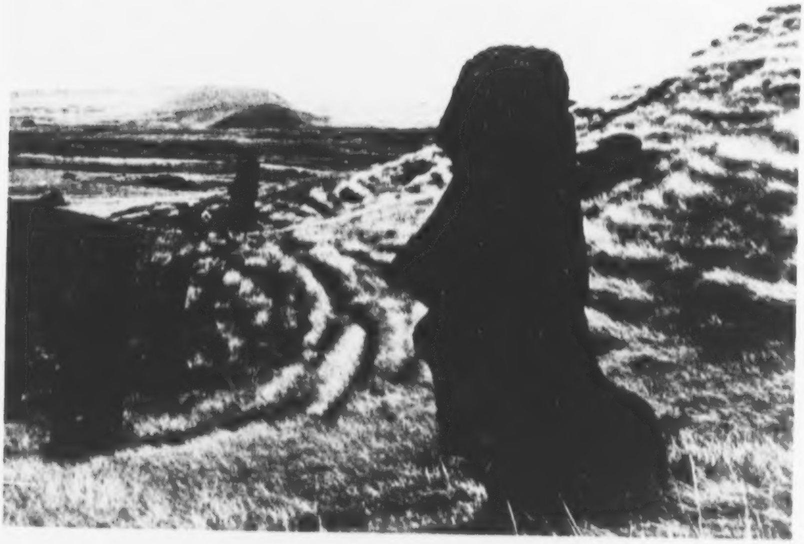


Figure II-19. The great "moi" monoliths are found around the coast of the island and throughout the interior (above). The interior of the Rano Kao volcano once supported agriculture and perhaps as many as 1,000 family dwellings (below).

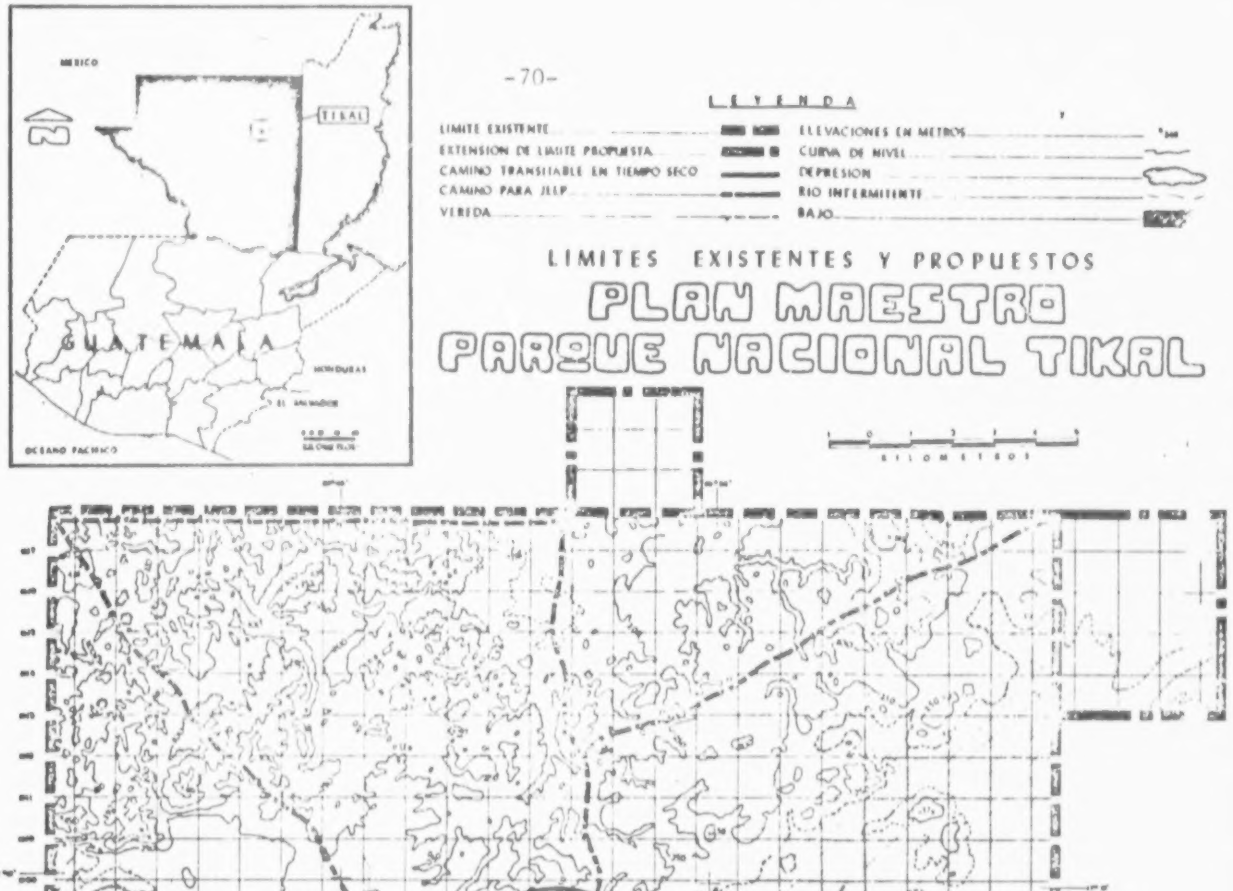


Figure II-20. The plan for Tikal National Park in Guatemala integrates the maintenance and restoration of the pyramids and other structures within the context of protected tropical rain forest.

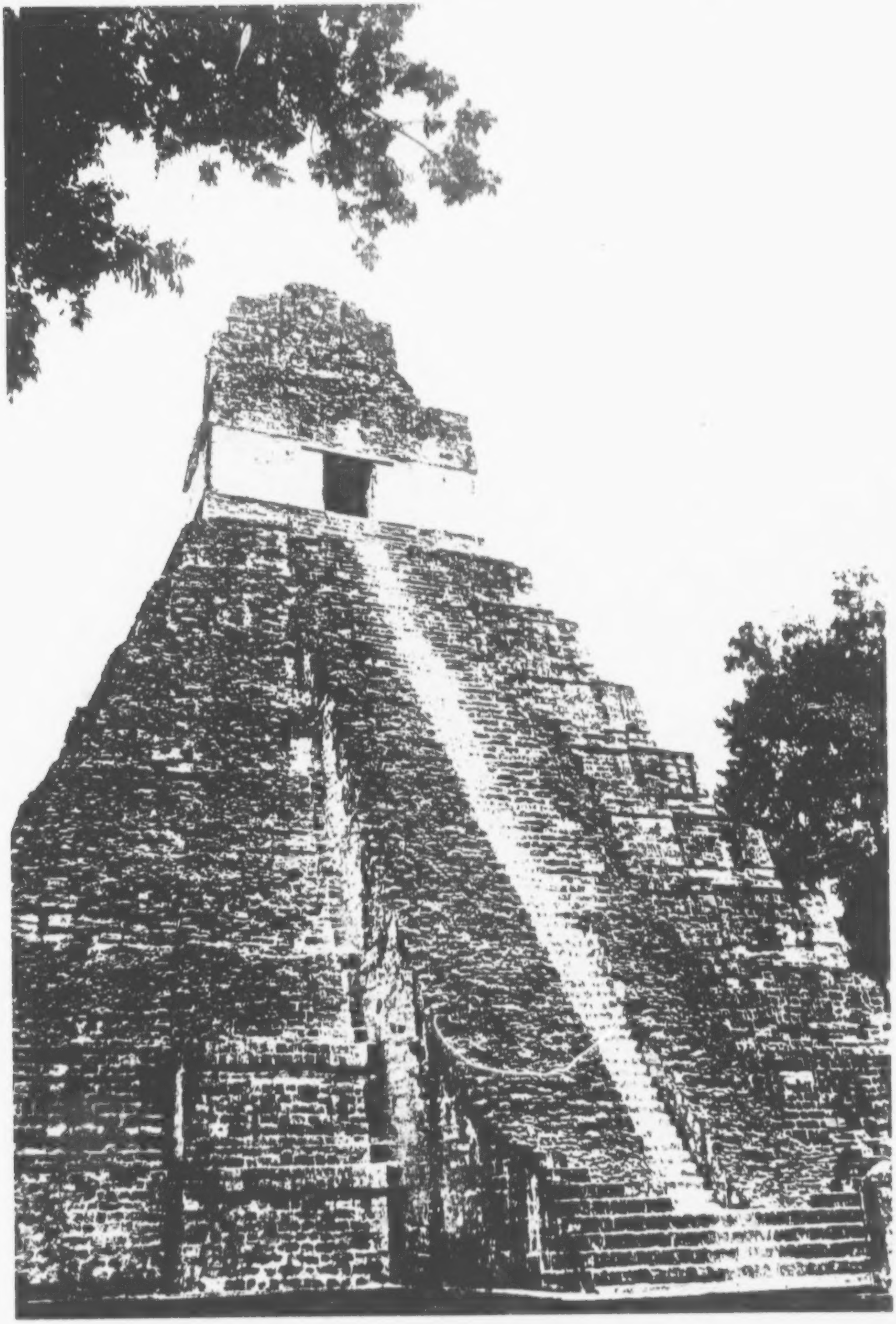


Figure II-21. By incorporating the outstanding Mayan Pyramids of Tikal, Guatemala, within a national park, the surrounding forests can be more adequately protected.

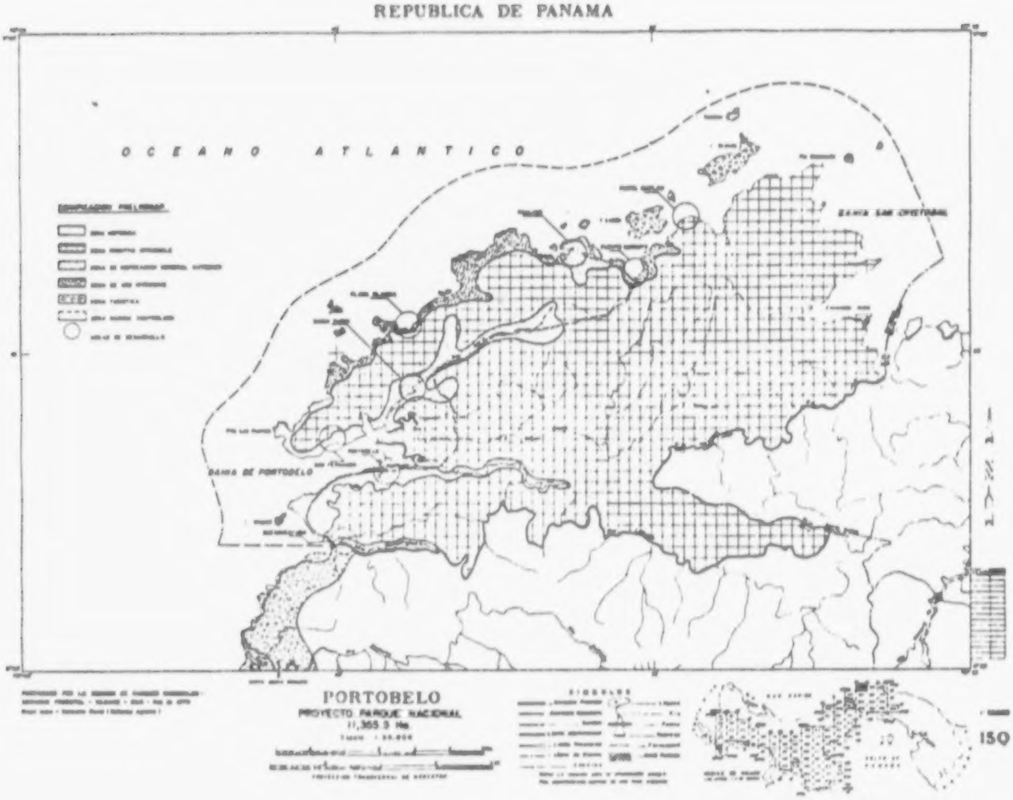
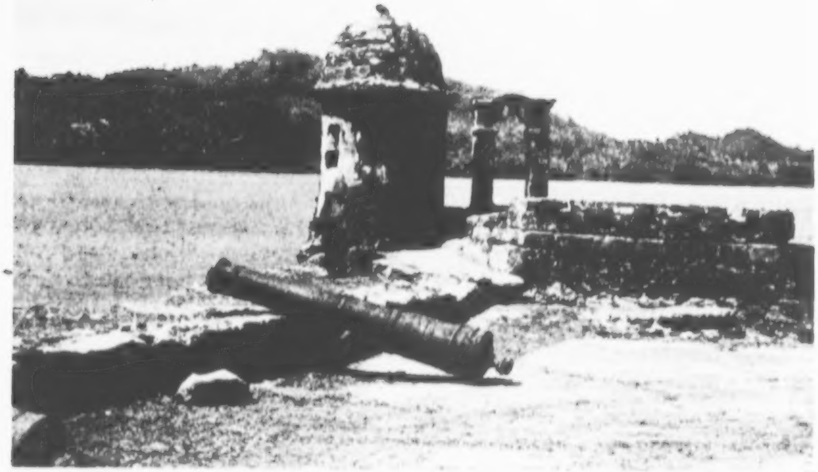


Figure II-22. The plan for the proposed Portobelo National Park in Panama provides a mechanism to integrate the management of cultural monuments, tropical forests, watersheds which receive very high rainfall, beaches, marine resources and overall scenic values.



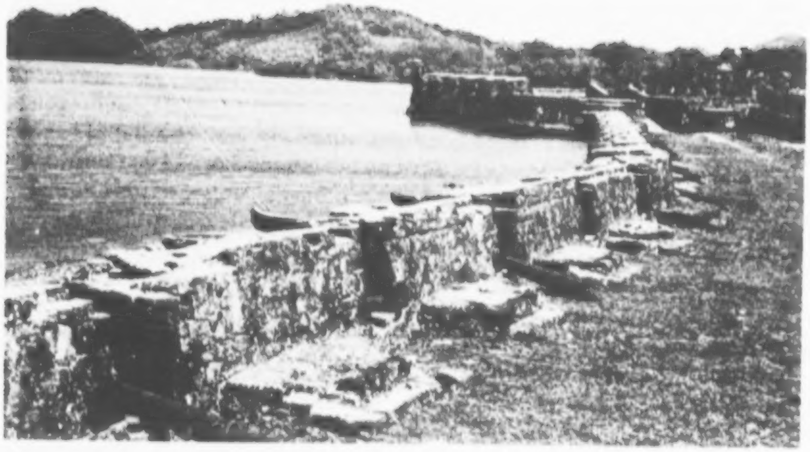


Figure II-23. The Spanish fortresses at (proposed) Portobelo National Park can only provide the visitor with an adequate appreciation of the context during the colonial period if the tropical forest is maintained to provide an appropriate background.

mountain habitats which warrant protection as a representative sample of the biotic province. Furthermore, the intensive rainfall makes it essential to maintain forests on the slopes and related watersheds to protect the cultural monuments from erosion and sediment.

The famous "lost city" of the Inca -- Machu Picchu -- in Peru has been undergoing restoration and has received tourism since shortly after the site was "discovered" in 1911. (See Figure II-24.) Until recently, primary consideration has been given to the investigation, restoration and protection of the ruins under the authority of the National Cultural Institute. Similar to the situations Tayrona, Portobelo and other sites, migratory agriculture and other rural land uses have begun to surround the sites and threaten the integrity of the surrounding landscape. Whereas early emphasis was naturally preoccupied with protection and restoration of the core area, subsequent research reveals that objects, structures and sites are also to be found in the surrounding forests and mountains. Furthermore, so long as the surrounding forests were left unaltered there was little need for concern. But now that the forests surrounding the site are being challenged, priorities have shifted and solutions must be sought. Through careful interdepartmental cooperation, regional planning, and the impetus of development for the long-term stable welfare of the rural population, the Peruvian Government extended the concept of archeological site to that of a national historic sanctuary.[56]

Each of the mentioned cases shares several common motivations for the integration of natural and cultural resource management: First, there is the need to maintain a natural, aesthetic or culturally consistent landscape around the monuments; second, there is need to maintain opportunities for archeological research in surrounding lands; and third, there is need to control the development and use within the monuments and nearby surroundings as well as on the adjoining mountains, valleys, riverine or coastal strips. Specifically, management must control erosion, transportation, tourism, sewage disposal, energy production and distribution, and the like.

From these examples it can be readily appreciated that national parks are playing a role in the maintenance of some of the region's most outstanding cultural heritage areas. While archeology and history have not normally been part of the traditional work of national park departments, the need to bring wildland management techniques into cultural heritage maintenance has provided the impetus for interdepartmental cooperation. From this effort, new land management practices and institutional mechanisms are being formulated to provide for the unified management of large composite natural-cultural parks.

There are many sites of national and international significance which are yet to be managed under some protective form of land use. In addition to many of the better known pyramids and fortresses, there are battlefields and other places of historical importance which are being destroyed by erosion or human activities. Among these sites with uncertain protection are the major battlefields of Bolivar, San Martin, Sucre and other revolutionary armies, the Sierra Maestra mountain camps and trails of Fidel Castro, important sites and trails in relation to

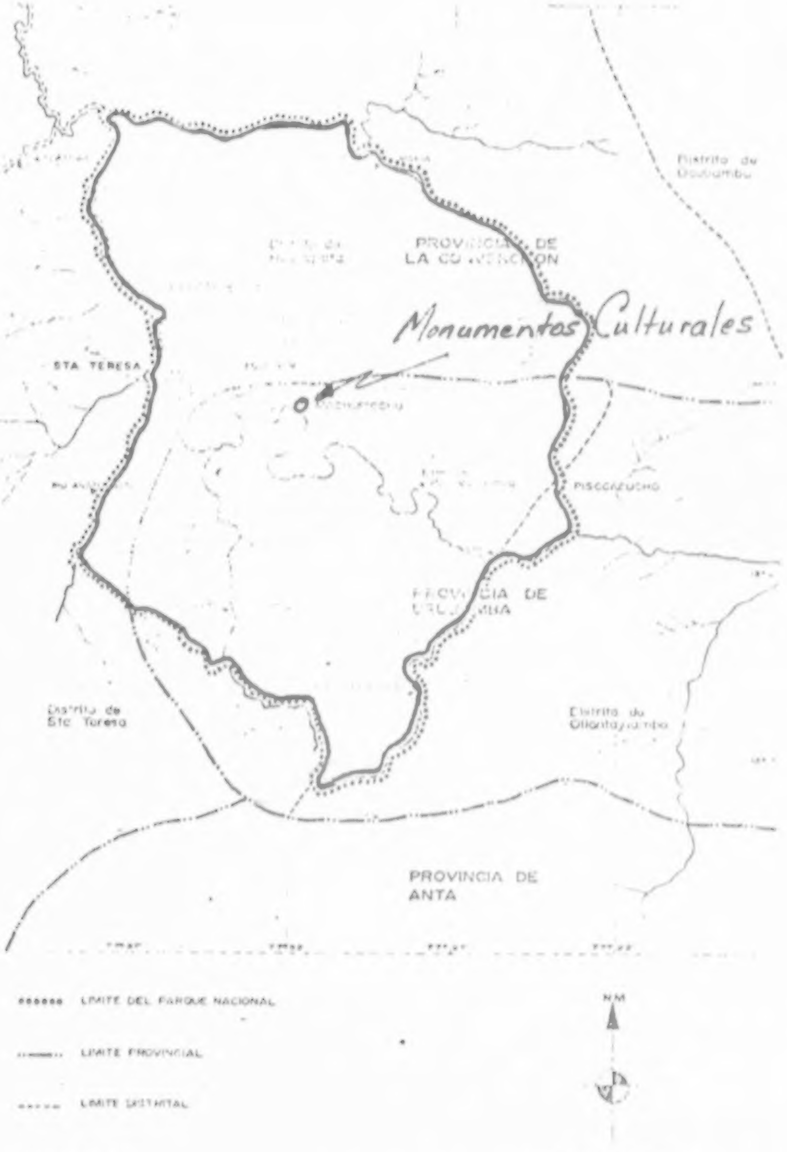


Figure II-24. The proposals for the Machu Picchu National Historic Sanctuary in Peru makes specific provisions to extend the protected area to include surrounding forest lands.

the routes of the early European explorers and the "Las Cruzes" crossing the Ithsmus of Panama. The role of national parks and other wildland categories in the maintenance of objects, structures and sites of cultural value require urgent attention. In countries such as Costa Rica, the national park service has been given responsibility to manage both cultural and natural areas of national significance.

Protect Scenic Beauty

As noted earlier, the protection of scenic beauty was one of the original reasons for the establishment of national parks. It was the spectacular qualities of the geysers and mountain scenery of Yellowstone which inspired the members of the Washburn-Doane Expedition to express their concern for the future of these resources.

Although it is subjective to categorize, judge and rate the values of scenery, it can be noted that most national parks in Latin America contain waterfalls, glaciers, snow fields, mountain peaks, and sand dunes, volcanoes, concentrations of wildlife, beaches and shorelines. Since the values associated with scenery are related to local culture, the criteria for the selection of scenic beauty are generally a matter of national scope. Each nation will tend to choose those areas for management as national parks which include examples of the scenic resources of greatest value to that culture. However, there are also scenic values which have received international recognition. These deal primarily with superlative features, such as the highest waterfall in the world, found in Canaima National Park, Venezuela.

Scenic beauty has been a major reason for the selection of many areas for management as national parks in Latin America. In some cases, however, areas were selected primarily to provide protection for scientific or recreational reasons, and any scenery which happened to be in the area was only consequently protected.

The fact that a park includes a representative sample of a major biotype, ecological transition areas, key genetic resources and perhaps a cultural site, does not automatically imply that scenic beauty will also be maintained. The protection of scenic beauty requires that the relevant resources be selected and managed as integral elements of the national park. (See Figure II-25.)

Several examples of the ways in which national parks serve to protect scenic beauty in Latin America can be noted:

The Tijuca National Park in Brazil lies virtually within the urban center of Rio de Janeiro. The park's 3,300 ha are divided into three discontiguous sectors consisting primarily of forested mountain lands which provide the city with a spectacular green backdrop. The park provides the urban dwellers and visitors with recreation opportunities, and originally it played an important role in protecting the city's water supply. (See Figure II-26.)

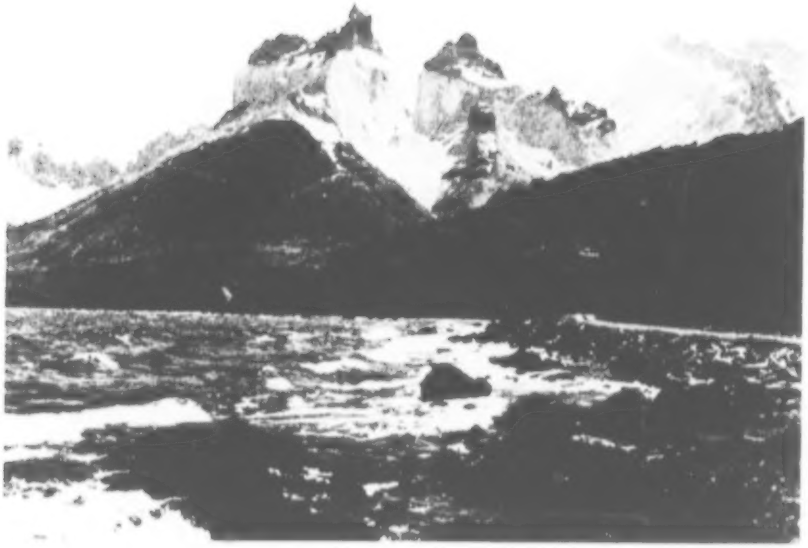


Figure II-25. The original boundaries for the Torres del Paine National Park in Magallanes, Chile, did not embrace the lands required to manage the scenic shed for the spectacular mountain towers. As a result of the management planning effort of 1974, the park was amplified to provide for the protection of scenic beauty.

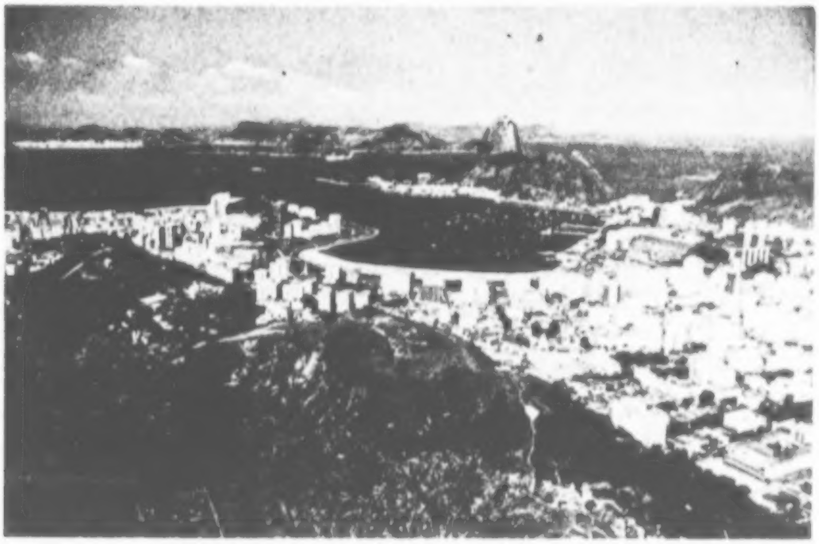


Figure II-26. The Tijuca National Park maintains the scenic backdrop for the city of Rio de Janeiro, Brazil. The park includes the forested mountains extending from the upper elevations of the city at 100 meters above sea level to the peaks at 1,021 m.

The 3 million ha Canaima National Park of Venezuela provides protection for Angel Falls -- the world's highest -- and its entire watershed. The falls was among the major features which first attracted attention to the area and developed interest in its protection. The park also maintains the scenic integrity of the majestic flat-topped tepuis of the Guiana Shield formation, which extends from western Guyana across southern Venezuela into south central Colombia and north central Brazil. (See Figure II-27.)

The Vicente Perez Rosales National Park of Chile includes examples of the spectacular scenery of the Lake District. Snow-covered volcanoes, deep blue lakes and forested mountains are found in the 135,175 ha park. One of the major routes for tourism crossing the Andes between Chile and Argentina passes through the park via ferry boat and roadway. The park provides the scenic backdrop for this world famous tour. (See Figure II-28.)

The already noted expansion of the original archeological monuments at Machu Picchu, Portobelo, and Tikal are examples of the growing awareness of the need to ensure the scenic shed for cultural resources. In these and other cases, there was a growing fear of losing the natural scenery surrounding the sites due to encroaching agriculture, fire, logging, and other conflicting uses. In effect, while the stage of the theater and the show itself were being presented and maintained, the scenery and curtains were decaying, falling apart and being carted off. More specifically, the profound impression to be grasped by the visitor standing atop Pyramid One in Tikal, on the ramparts near an old cannon in Portobelo, or sitting high above the reconstructed walls, terraces and buildings of the Incan citadel, come in great part from the integrity of the entire scene. Those mountains, the swirling clouds, sudden cool breezes and rainfall, the sea and the rainbow, all envelope the visitor into the fantasy of life some hundred years ago. The role of a park is greater than the creation and preservation of a museum collection of objects and pieces; it is to create and preserve the opportunity for people of this and future generations to perceive the human experience of past generations -- to provide a link from the past into the future, and provide a point of anchor for the present in which humans live. Scenery is the resource in which that experience takes place, it is a curtain to cover distractions and show vividly the whole setting to be experienced. (See Figure II-29.)

Elsewhere, there are serious problems and deficiencies in the capability of national parks to protect scenic beauty. In many parks there are vistas which contain great natural beauty together with mineral extraction facilities (Purace National Park, Colombia), logging and sawmilling (Puyehue National Park, Chile) and the cut-and-fill debris and scars of highway construction (Tayrona National Park, Colombia). (See Figure II-30.)

Other forms of scenic inconsistency can be criticized but to little avail. Frequent vistas of slash-and-burn agriculture, itinerant domestic livestock, the removal of sand from beaches and the sites where vegetation has been removed for the manufacture of charcoal all point to the conflicts to be found in development and the human habitat. These

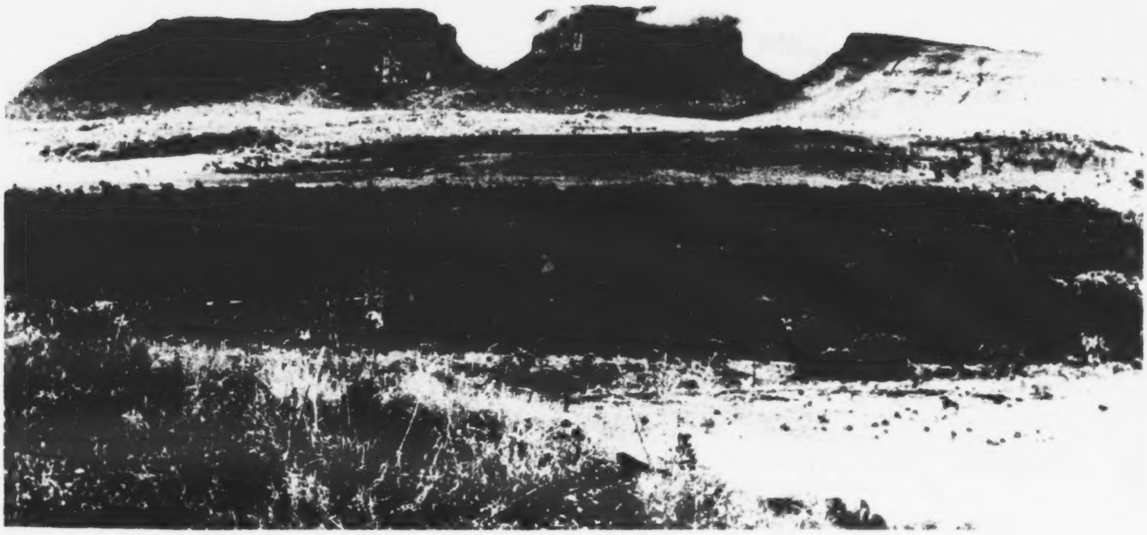


Figure II-27. The Canaima National Park of Venezuela provides for the protection of the majestic grandeur of the tepuis of the Guiana Shield formation.

Figure II-28. The Osorno volcano, often called the "Fujiama of South America," lies within the Vicente Perez Rosales National Park of Chile. The view is shared by visitors taking the internationally famous tour through the Lake District of Argentina and Chile.

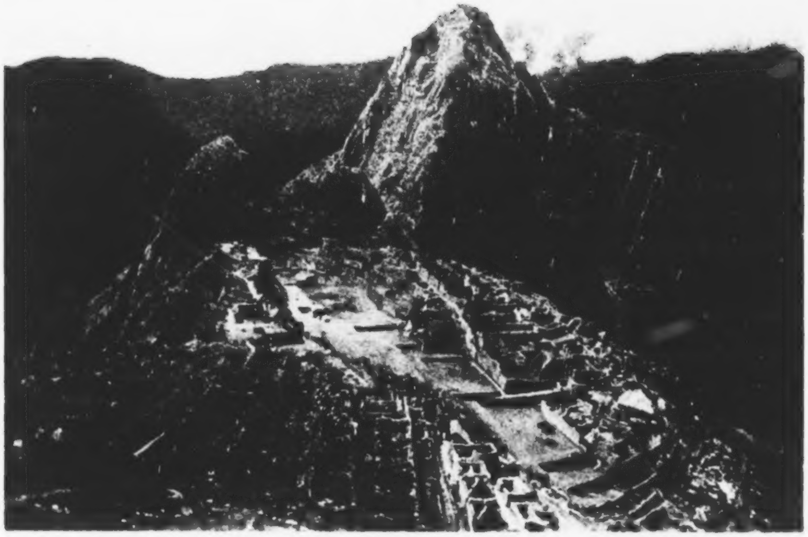


Figure II-29. The forested mountains surrounding the Incan citadel of Machu Picchu, Peru, provide the setting which is fundamental to the integrity and full enjoyment of the site. The original archeological monument is being expanded to include the surrounding lands as part of a National Historic Sanctuary.

Figure II-30. The construction of a highway into the heart of Tayrona National Park, Colombia, left open cuts on the up-hill slopes and debris on the down-hill slopes which perhaps irreversibly damaged the scenic beauty of the area.

conflicts will be resolved to the extent that social, economic, and political problems are solved. While the efforts required to solve these problems extend far beyond the scope of park management, parks can contribute to their solutions as will be considered more fully in subsequent sections below.

In conclusion, on the role of national parks in the protection of scenic beauty in Latin America, it can be demonstrated that parks have proven useful in several cases involving the maintenance of backdrops for urban centers, archeological sites and tourism routes. In other cases, non-conforming land uses are found along the park boundaries which distract from the scenery of the area. Finally, many parks contain or are surrounded by scenic disturbances which are in themselves symptoms of under-development and cannot necessarily be considered as signs of inefficient park management.

Facilitate Education, Research and Environmental Monitoring in Natural Areas

Education, research and environmental monitoring can be considered as three distinct objectives, however, they share in common the concept of LEARNING. Each is intended to support a growing capacity to understand wildland (natural and cultural) resources, to appreciate their significance more clearly, and to be able to make wiser decisions about their management and use in the future.

Education is considered here in a broad context to include formal and informal learning experiences in the outdoor natural environment. School and university students, civic and youth clubs or labor union groups come to national parks to study or simply encounter nature or culture. In general, specialized personnel of the park are assigned to guide or conduct these groups, to give information, and to interpret the resources and their significance to the visitors.

Education also includes the concept of preparing young scientists with experience in working in the outdoor natural laboratory. The park is an extension of the school and university classroom and laboratory in biology, ecology and other natural, earth, atmospheric and social sciences. Just as the industrial engineering student visits a factory to observe the "real world", the student of natural sciences can use a national park.

The educational experience need not only be in groups and conducted in a formal manner, but may involve an individual working on a specific activity. He may collaborate with a park officer in the design and operation of this study, then spend most of his time on his own with minimal control and supervision from park staff. Such activities may correspond to class projects, term papers, and theses for advanced degrees.

A second aspect of the objectives is research. Park management may require answers to certain questions concerning the availability of current or prospective management practices.

Will the new road disrupt the movements of fauna or plant succession? The park may also serve as a laboratory for conducting investigation on topics or by methods which require a natural environment. What is the productivity of the natural forest? Either way, the research function of the park is to provide facilities and services for scientists. Generally this requires that dormitory space, field camps and some laboratory space and equipment be provided. Often, the park must also provides guides, transportation within the park, and some contribution to the costs of room and food. While a passive role may be played by simply providing access and support to non-park individuals and groups wishing to carry out investigation activities in the park, it is in the best interest of park management that research be designed, supported and stimulated by management in order to learn about the park's resources and the role of the park in ecodevelopment. Viewed in this way, research is not an optional activity, but a vital and necessary element of management to guide and substantiate park management, interpretation to visitors, education, and the national conservation and development process.

The third aspect of the objective is environmental monitoring. The park can be studied on a relatively long-term and continuous basis to learn about fundamental relationships and trends between plants and animals and their environment. Monitoring of the spread of introduced animal species and the effects upon vegetation would be a relevant activity in the parks of Andean Chile and Argentina. Monitoring may also relate visitor impact to natural or cultural resources. On the simple end of the spectrum, monitoring consists of the systematic collection of observational data, for example, where park rangers report on the flow and activities of visitors, on a daily basis over several years. On the complex end, monitoring involves the systematic collection and processing of data, for example, where computers are utilized to measure the physiological response of natural forest in the park to various agricultural practices on adjacent lands. The computers may transmit the data via satellite, store the material, compare sites on several continents and supply scientists around the world with the materials with which they may evaluate the impact of those same agricultural practices upon the whole biosphere! Be the monitoring program simple or complex, there can be a prepared program of work which has formalized goals, procedures, data handling methods, standards for performance and final reports.

All three aspects -- education, research and environmental monitoring -- are of particular relevance to the role of national parks in ecodevelopment. Where parks are designed, developed and operated to provide services and facilities for these aspects, the social wildland capital can be utilized to support the educational system, the rational use of natural resources, and the overall management and development of rural lands. Similar to the control plot in the experimental forest, the park becomes the control plot (or bench mark) for the biotic unit -- it demonstrates the natural state of wild capital prior to the introduction of modern technological alterations. The cultural areas may also support this end by providing bench marks along the path of man's development under different levels of technology.

Thus, the education, research and environmental monitoring activities are capable of tying national parks to national conservation and development. They are necessary to support the preparation of citizens and scientists for understanding and appreciating natural and cultural resources, the management of the park resources themselves, and finally the overall management and development of the nation.

Until recently, these aspects have been considered as options, and at times, as luxuries of park management. Since nature was considered to "take care of itself," there was little need to do research beyond normal taxonomic and descriptive activities. Monitoring was viewed as over-sophisticated and unrelated to the park unit, and the park was generally taken to be unrelated to the health and welfare of the nation.

It can be demonstrated that scientists have been working in national parks for over a half century; students have always come to parks; and park employees have always been "monitoring" the activities of visitors, poachers and squatters. The question here, however, lies in whether these activities are carried out in response to management objectives, or whether they are merely elements of the general range of activities and services provided by parks. If these activities were treated as integral elements of the design, development and operation of parks, then surely the parks would be considered as elements of the nation's research and educational facilities. Are parks considered on par in importance with forest, agricultural and livestock experiment stations? Are the parks viewed to be at least as important as the classroom? Where the previously considered objectives or park management are perhaps abstract and "scientific," this education/research/environmental monitoring objective relates to all citizens and to all bureaus of government.

During the period 1972-1974, the Costa Rican Park Service initiated a program to receive organized groups of school children from primary and secondary grades.[57] The classes were given guided walks through the different forest formations leading up to the spectacular rim-side view of the active Poas volcano. A small visitor center provided additional interpretation of the volcano and its relationship to man. The groups then ate a picnic lunch in an attractive outdoor setting. Following each visit, the teachers of each class were given an opportunity to discuss the day's activities with the park staff. (See Figure II-31.)

Following the reception of several hundred students, it became apparent that the park staff could not provide personal interpretation services to each class. While some form of intensive educational experience in the park was considered to be the ideal, a large volume of park visitors would require a greatly expanded park staff. The multiplier was found in working with the Department of Education of the University of Costa Rica. Classes of future school teachers and their professors came to the park and worked with the park staff. To the extent that university professors could prepare future teachers on the use of parks for biology, geology, conservation and related field trips, future groups of primary and secondary students would be guided by their own teachers. The park staff would then be free to supervise as necessary and still continue with other management duties.

Figure II-31. Organized school groups visit Volcan Poas National Park, Costa Rica. While the students visit the crater and visitors' center, the teachers are being oriented in the utilization of the park for educational activities.

Puyehue National Park in Chile's southern temperate rainforest has been developed to provide visitors with an educational experience. A visitor center and self-guiding nature trail were completed in 1973. During the first season of operation it was estimated that approximately 2,300 individuals per week visited the "Aguas Calientes Recreation Area" with its interpretative facilities.[58] (See Figure II-32.)

Interpretation in historical areas has been under development for a longer period of time than that in natural areas. Visitors to the ancient Toltec, and later Aztec city of Teotihuacan near Mexico City, as well as to the Mayan cities of Yucatan, the Incan centers of the Sacred Valley in Peru, and to various historical buildings such as the death place of Simon Bolivar in Santa Marta, Colombia, have had access to guides and literature for more than a decade. Within the context of a natural area where cultural values are to be found, Santa Rosa National Park demonstrates a process of research, reconstruction and interpretation. The historic site with its hacienda, corrals, and battlefield was studied by historians and historical architects.[59] Park management reconstructed and developed the area as a national shrine and visitor area. School children now come to learn about the battle with the "Filibusteros", as well as the life-style of the hacienda in the mid-1980's.

The parks in Argentina have been utilized for research since the early 1940's. The Argentine Park Service has published technical and scientific articles in various forms to support the development of fundamental knowledge about each park.[60] Research activities are carried out by personnel of the Service as well as through contracts with national universities. In other cases, such as that exemplified by the glaciological research being carried out in Glaciares National Park, research and monitoring have been realized through cooperative efforts with other national institutions.[61]

The Peruvian Forest and Wildlife Directorate has pioneered the linkages between research and management. New conservation units are studied for species content, diversity, habitats, the relative uniqueness of the resources and their significance in terms of national and international value. Most significant, interdisciplinary and interdepartmental field studies are carried out prior to the allocation of wildland areas by the government, to determine what, if any, portions of the area warrant special status as conservation units.[62]

In Peru's Pampa Galeras National Vicuña Reserve research has been a basic element of the management program since 1965 when the area was first provided protection. Researchers studied the vicuna (*Vicugna vicugna*), its habitat, behavior, and the overall institutional and landuse context.[63] Along with this, a monitoring of the vicuna population has been in effect to demonstrate the response of the species to protection and other management activities. As noted in Table II-3, the response has been positive and dramatic. Such information has provided the basis upon which past management has been evaluated and the new "Vicuna Rational Utilization Project" has been prepared and financed.[64]

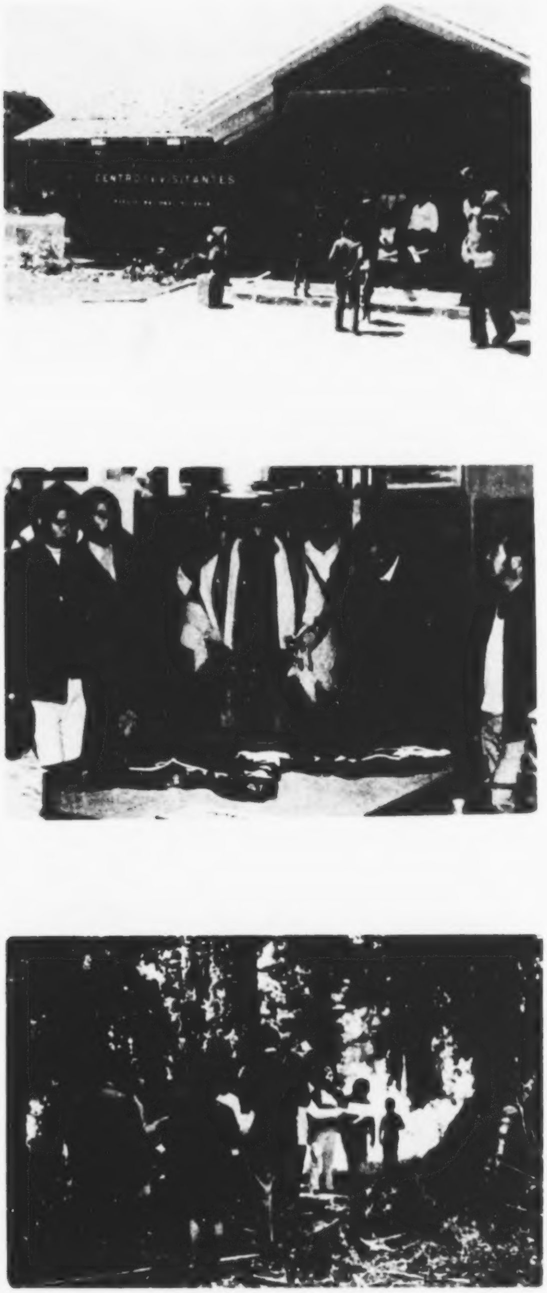


Figure II-32 continued. In Volcan Poas National Park, Costa Rica, exhibits in the visitor's center explain the relationship between volcanoes, agriculture, water and other aspects of importance to human life.

Figure II-32. Interpretative facilities are offered to visitors to develop an appreciation and understanding of natural and cultural heritage. Such services link the efforts of research and monitoring to the future scientist, engineer, teacher and general citizen. In Puyehue National Park, Chile, a visitor's center and self-guiding nature trail provide contact between the visitor and the natural history of the temperate Valdivian rainforest.

TABLE II-3

POPULATION OF VICUNAS IN THE NATIONAL VICUNA RESERVE, PERU, AND ITS AREA OF INFLUENCE FROM 1965 TO 1976

Year	No. of Vicuña	Area of census (ha)
1965	1,000 (estimated)	6,500 ha
--	--	--
1969	3,298	6,500
1970	4,543	?
1971	5,883	?
1972	7,291	125,000
1973	9,343	125,000
1974	12,865	125,000
1975	17,916	125,000
1976	24,750	140,000
--	--	--
(1980	65,000	300,000)

Source: Personal communication with personnel of the National Forestry and Wildlife Directorate, Ministry of Agriculture, Lima, Peru, January 21, 1977.

Education, research and environmental monitoring have been developed as an integrated program in the Galapagos Islands National Park of Ecuador. Personnel of the park and the Charles Darwin Research Station, have studied habitat requirements and investigated factors which place such animals as the Galapagos tortoise (*Geochelone elephantopus*) in danger of extinction. Measures for the necessary corrective action have been designed and implemented. Goats and other feral animals are being systematically eliminated on specific islands by park personnel. Subsequent observations are gathered to inform management of the response of the area to measures which have been applied. In this integrated work, the park personnel, scientists, university students and local citizens are involved. New knowledge is gained and shared through a broad range of publications in the Spanish and English languages. (See Figure II-33.)

While Pampa Galeras National Vicuña Reserve and Galapagos National Park contain permanent research and monitoring personnel, facilities, and activities as normal elements of their management programs, research and monitoring are also carried out on a periodic basis in many other parks. For example, the Manu, Santa Rosa, Tayrona, Tortuguero and Volcan Poas parks contain permanent dormitory and laboratory facilities which are available for use by scientists and advanced students, and there has been such demand in Corcovado that a biological station is being planned to accommodate visiting scientists and students. (See Figure II-34.) In these parks, research has been carried out to inventory species, coral reefs and marine turtles, to examine the habitat and behavior of primates and crocodilians, and to study other aspects of immediate interest to management. In Santa Rosa, the savannah lands were studied to provide management with a plan for the maintenance and control of plant succession in the historic sector of the park. (See Figure II-35.)

In southernmost Chile where the great glaciers of the Andes plunge down to meet fresh and saltwater in Torres del Paine National Park, research on the guanaco (*Lama guaniacoe*) and other local species supported management and development planning. The published plan provides for the construction of a permanent research station to serve research workers, scientists from other national and international institutions, and students.[65] (See Figure II-36.)

In addition to the aforementioned education, research and monitoring activities supported by national parks, a large amount of support goes unnoticed. For example, parks in most countries host systems of hydrographic measurement and analysis. The streams in the parks and elsewhere are calibrated through the use of permanently installed equipment. Parks also serve as control areas to study vegetative cover and soils from undisturbed ecosystems. The results of many such studies are to be found in the files of local and foreign universities and in other institutions. Parks have provided services and indirect or even direct costs to support this work, yet the credit generally has been awarded to other individuals and organizations.

In conclusion on the role of national parks in facilitating education, research and environmental monitoring in natural areas, it

Figure II-33. The Charles Darwin Research Station in the Galapagos Islands National Park, Ecuador is the largest such complex in a national park in the region. With the cooperation and support of the Charles Darwin Foundation, United Nations organizations, the Ecuadorian government and the Ecuadorian Forest Service and several universities, the station has made major contributions to the development and management of the Park, and to education and science in Ecuador and elsewhere.

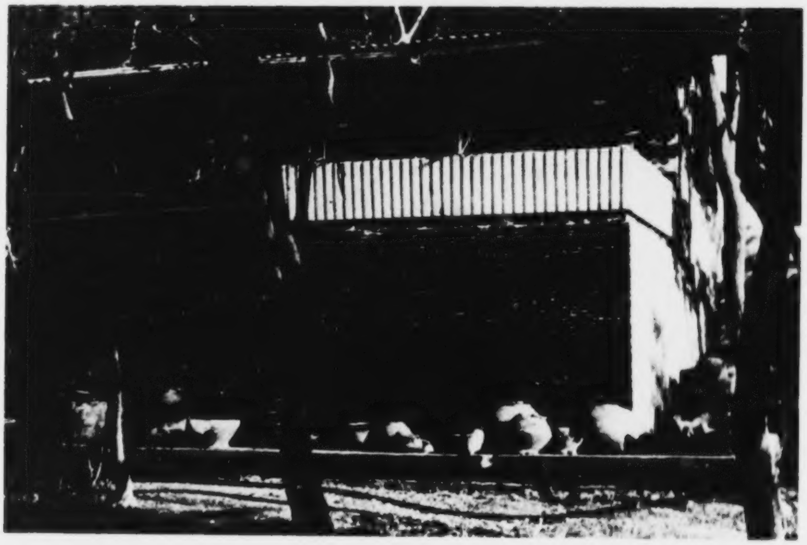


Figure II-34. Permanent dormatory and laboratory facilities have been installed for use by scientists and advanced students in several national parks. In the Manu National Park of Peru a research station has been constructed on the Cocha Cashu, an ox-bow lake of the upper Amazon drainage (above). The Tayrona National Park of Colombia includes a research facility on Gairaca Bay of the Caribbean Sea (below).

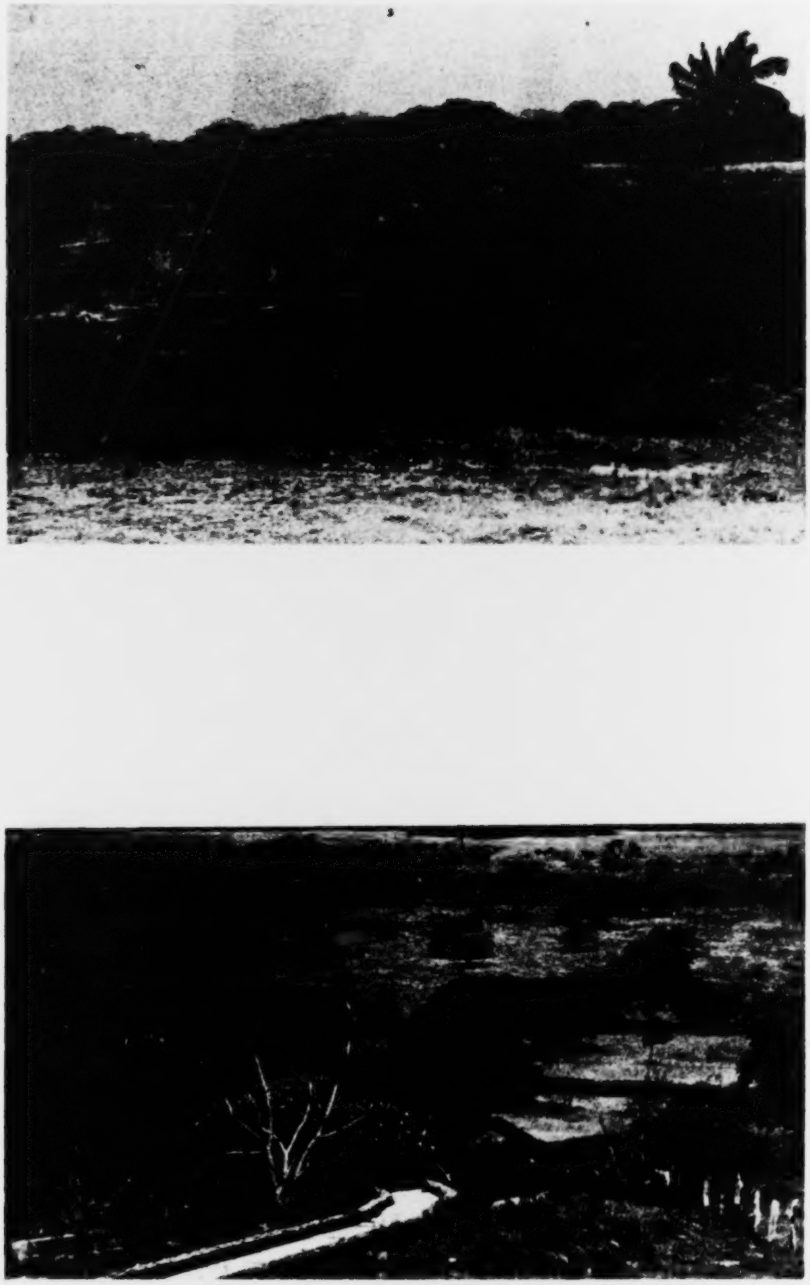


Figure II-35. The research program at Santa Rosa National Park in Costa Rica provided guidelines for the use of fire to control and maintain the savannah environs in the historic zone around the hacienda and battlefield.

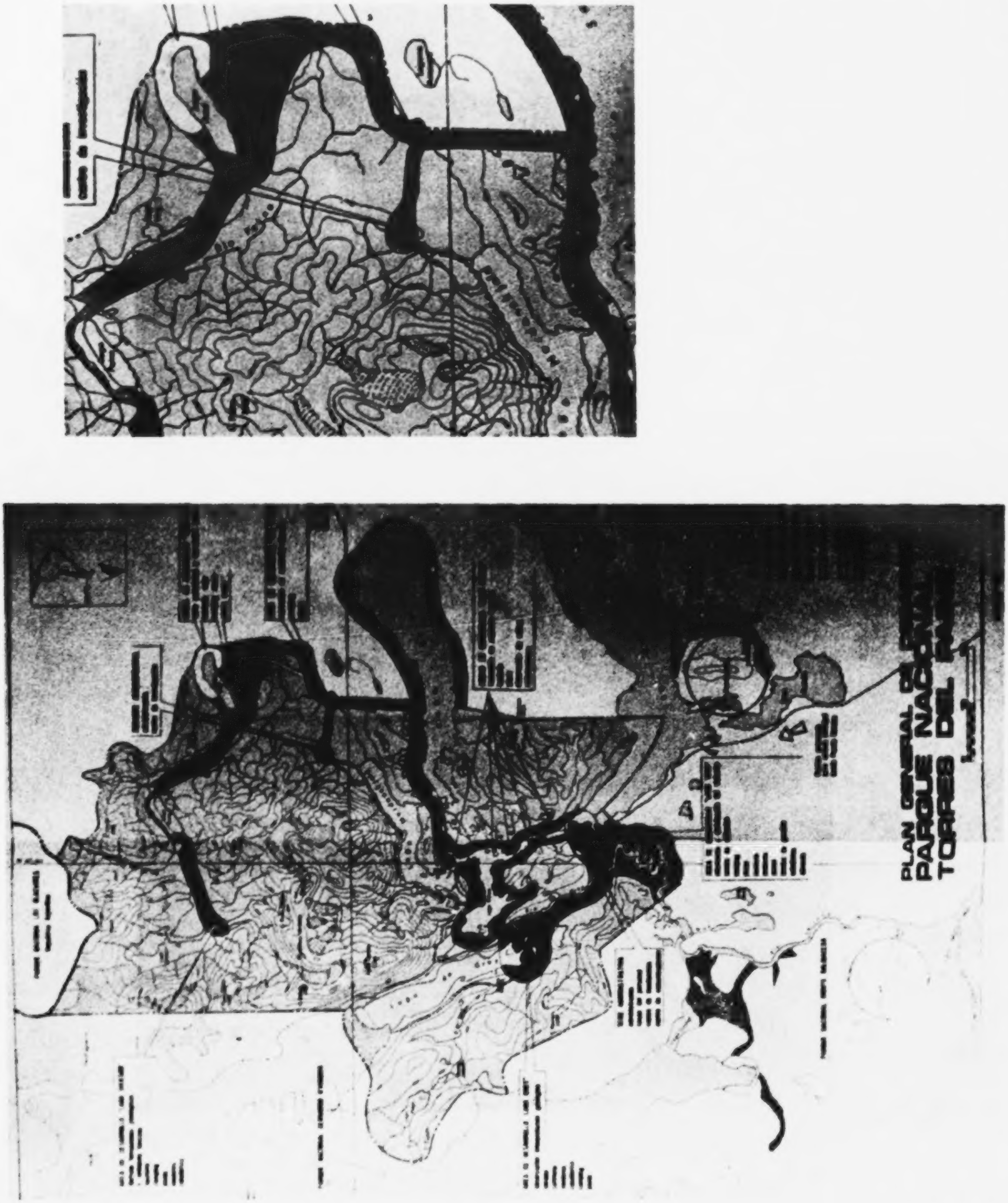


Figure II-36. The Management Plan for the Torres del Paine National Park of Chile provides for the installation of a permanent research center to focus on the Patagonian and southern Andean biomes. A particular problem of interest is the restoration and maintenance of the indigenous fauna including the guanaco and rhea.

can be purported that all three activities are contributing to the management of individual national parks and ecodevelopment for the respective nation. It is significant that research programs were among the first to be implemented in the development of several national parks. In some cases, the information gathered from early research and monitoring activities has already guided managers to correct and improve their efforts. In several parks, visitors can benefit from interpretation programs.

The cases which have been mentioned serve to demonstrate the potential which lies ahead. The fact remains, however, that only a few cases can be found where education, research and monitoring are active and normal elements of park management. Most national parks are not visited by school children. Few parks have been utilized by scientists and researchers for their work. And, few parks serve as control plots for the permanent gathering of environmental data.

Facilitate Public Recreation and Tourism

As in other regions of the world, the national parks of Latin America were established in great part to provide opportunities for recreation and tourism in natural and cultural environments. Governments stimulated the use of many of the early parks by providing access and constructing hotels and other facilities. Examples of these parks include Avila, Henri Pitier, Iguacu, Iguazu, Itatiaia, Nahuel Huapi, Puyehue and Vicente Perez Rosales. Other parks were located in remote areas and were visited only by a few dedicated scientists, mountaineers and hikers.

Little noticed has been the recreational use of wildlands by local rural residents. For decades prior to the establishment of many parks, the areas were already in use for fishing, picnicking, and camping. (See Figure II-37.)

Few long-term data exist on the recreational use of wildlands, including national parks and other categories. In Puerto Rico, outdoor recreation was first noted in the 1940's as residents began to bathe along ocean beaches and walk in the forests. Table II-4 illustrates the growth of recreational visitation to national and commonwealth forests, public beach developments, historical monuments and the developed urban outdoor recreation plazas. Previously, recreation in the outdoors was realized predominantly by traditional activities in the town plazas. By 1961 the Commonwealth Recreation Development Administration and Forest Service had begun to develop beach and forest recreation areas. By 1963, visitors to these sites were predominantly island residents.[66]

The numbers of visitors to 18 of Latin America's national parks during 1973 are shown in Table II-5. Of these, data for 11 parks were obtained in comparable form to demonstrate the increase in visitation to the parks over a three-year period from 1971 to 1973. This is shown in Table II-6. In general, the growth of visitation to national parks can be expected to increase with the development of urbanization, industry,

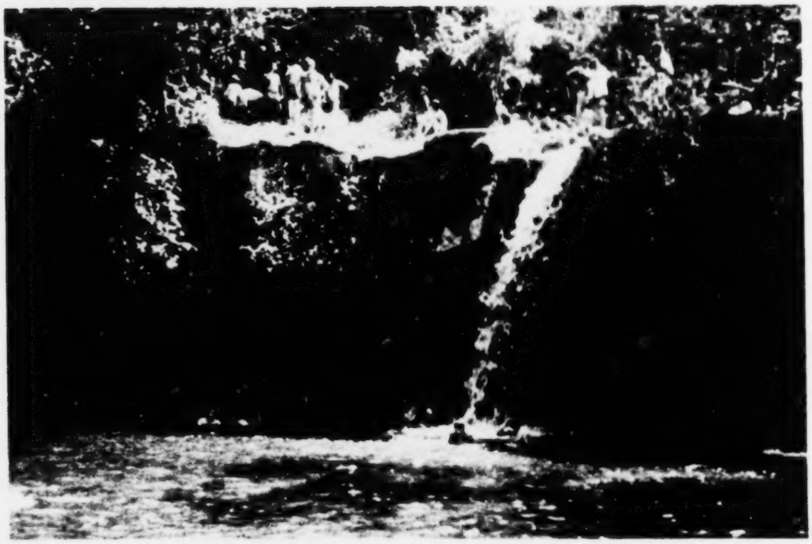


Figure II-37. For years prior to the establishment of Y'bicui National Park in Paraguay, local rural residents utilized the waters and forest for recreational purposes.

TABLE II-4

OUTDOOR RECREATION SERVICES AS RECORDED IN PUERTO RICO AND THE U.S. VIRGIN DURING THE PERIOD 1940 to 1963

Year	Recreation in Forest Areas	Recreation in Beach Areas	Recreation in Historic Monuments	Recreation in Urban Sport Areas	Total Aggregate Outdoor Recreation (AOR) Recorded for Year
	- Visits -	- Visits -	- Services -	- Visits -	- AOR -
1940	30,000[a]	--	--	--	30,000
1950	60,000[a]	--	--	--	60,000
1951	--	--	--	--	--[g]
1952	--	--	--	--	--[g]
1953	--	--	--	--	--[g]
1954	--	--	68,744	--	[68,744][g]
1955	--	--	86,052	--	86,052[g]
1956	281,952	--	124,350	--	406,300
1957	306,053	--	163,496	--	469,549
1958	329,835	--	212,089	--	541,924
1959	378,549	--	219,470	--	598,019
1960	412,827	--	369,624	--	782,551
1961	454,600	611,069	403,032	411,903	1,880,604
1962	474,339	693,291	480,263	8,247,430[f]	9,895,323
1963	476,923[b]	931,915[c]	326,184[d,e]	10,178,106[f]	11,913,128
Total AOR by Class	3,169,075	2,236,275	2,453,304	18,826,439	

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[a] Estimated from U.S. Forest Service files, Rio Piedras, Puerto Rico.

[b] Includes Luquillo Forest, Commonwealth Forest, Monte del Estado and La Mina.

[c] Includes Luquillo Beachand Isla Verde Beach Resorts.

[d] Includes all N.P.S. sites in region.

[e] This figure is low because several service forms were discontinued during that year.

[f] Includes attendance at 107 of 416 sites of Parks and Recreation Administration.

[g] Data for Luquillo Experimental Forest not available.

Source: Miller, K. R. Some Economic Problems of Outdoor Recreation Planning in Puerto Rico. PhD Dissertation, SUNY College of Forestry at Syracuse University, Syracuse, New York, 1968. p. 8.

TABLE II-5

PUBLIC VISITATION TO EIGHTEEN SELECTED NATIONAL PARKS IN LATIN AMERICA FOR THE YEAR 1973

National Park	Country	1973 Visitors/year
1. Iguazu N.P.	Argentina	200,000
2. Nahuel Huapi N.P.	Argentina	300,000
3. Iguacu N.P.	Brazil	325,000
4. Brazilia N.P.	Brazil	200,000
5. Itatiaia N.P.	Brazil	80,000
6. Serra dos Orgaos N.P.	Brazil	750,000
7. Tayrona N.P.	Colombia	40,000
8. Salamanca Island N.P.	Colombia	15,000
9. Galapagos N.P.	Ecuador	6,000
10. Tikal N.P.	Guatemala	24,000
11. San Miguel N.P.	Uruguay	20,000
12. Santa Teresa N.P.	Uruguay	250,000
13. Guatopo N.P.	Venezuela	120,000
14. Canaimi N.P.	Venezuela	8,000
15. El Avila N.P.	Venezuela	900,000
16. Henri Pittier N.P.	Venezuela	85,000
17. Volcan Poas N.P.	Costa Rica	60,000
18. Santa Rosa N.P.	Costa Rica	15,000
	Total	3,423,000

Source: Dalfelt, A. Some Data Related to Costs and Benefits of National Parks in Latin America. Draft. CATIE, Turrialba, Costa Rica. 1976. p. 35.

TABLE II-6

PUBLIC VISITATION TO ELEVEN SELECTED NATIONAL PARKS IN LATIN AMERICA FOR THE YEARS 1971, 1972 AND 1973

National Park - Country	YEAR		
	1971	1972	1973
Iguazu N.P., Agrentina	150,000	130,000	200,000
Iguacu N.P., Brazil	300,000	310,000	325,000
Tayrona N.P., Colombia	5,000	25,000	40,000
Salamanca Island N.P., Colombia	10,000	12,000	15,000
Santa Rosa N.P., Costa Rica	10,000	10,000	15,000
Volcan Poas N.P., Costa Rica	45,000	55,000	60,000
Tikal N.P., Cuatemala	15,000	19,000	24,000
El Avila N.P., Venezuela	600,000	750,000	900,000
Guatopo N.P., Venezuela	100,000	120,000	120,000
Henri Pittier N.P., Venezuela	80,000	85,000	85,000
San Miguel N.P., Uruguay	10,000	15,000	20,000

Source: Dalfelt, A. Some Data Related to Costs and Benefits of National Parks in Latin America. Draft. CATIE, Turrialba, Costa Rica. 1976. p. 37.

agrarian reform, highways or other access and public transportation. Full-time and year-round salaries or wages, access to automobile or bus, and the advent of the "weekend" are among the key factors which have generally made park recreation possible.

One of the most spectacular cases in the development of parks and recreation/tourism is that of the Chubut Provincial Department of Tourism. Beginning in 1965, eight relatively small reserves were established around the Valdez Peninsula and along the nearby coastal lands. (See Figure II-38.) The objective was to provide protection for the sea lion, fur seal, elephant seal, penguin, southern white whale and other related wildlife. Highways, motels, campgrounds and service centers for automobiles were developed on a planned basis. Approximately $50,000 were invested in each reserve for guard houses, office buildings, fencing and tourist facilities. By the 1972-1973 season, some 118,000 visitors came to the Province of Chubut. Studies by the Provincial Tourism Department show that 95 percent of these visitors came to Chubut to see the wildlife reserves. On the average, each tourist spent $10 per day while in Chubut and remained 6 days in the province. Thus by simple calculation, tourism to view wildlife brought to Chubut Province some $6.73 million (US).[67] (See Figure II-39.)

The case of Puyehue National Park in Chile demonstrates the potential impact of planned park management and development. The Park and Forest Administration (APARFO), later reorganized as the National Forestry Corporation (CONAF), identified the park for priority recreation development. Plans were prepared during a two-year period.[68] Construction on the "Aguas Calientes Development Area" was initiated during 1971. The area was inaugurated for use in January 1972, providing facilities and services for camping, bathing in natural hot springs, picnicking, hiking, fishing, rental cabins and a nature interpretation center with auditorium and an adjacent self-guiding nature trail. Throughout the two-month summer season, some 1,000 visitors came to the park on Saturdays and Sundays. The capacity of the area was filled the first day it became available to the public. Some ninety-five percent of the visitors were Chilean nationals, predominantly from that province. They came in buses, farm vehicles, commercial truck and automobiles.[69] (See Figure II-40.)

Statistics on international tourism to national parks in Latin America are difficult to find. The tendency is to mix the data on national visitors together with international travelers. This can lead to gross misrepresentation of the economic impact of national parks. Normally, the local visitor who utilizes the park for a day will spend little or nothing enroute to the park.

What appears to be the case until recently, however, is that most international tourism to Latin America has concentrated on the famous resort beaches of Acapulco, Mar de Plata, Punta del Este, Rio de Janeiro, San Juan, Varadero, and Vina del Mar. Another major area of concentration has been the cultural monuments in Central America, Mexico and Peru.

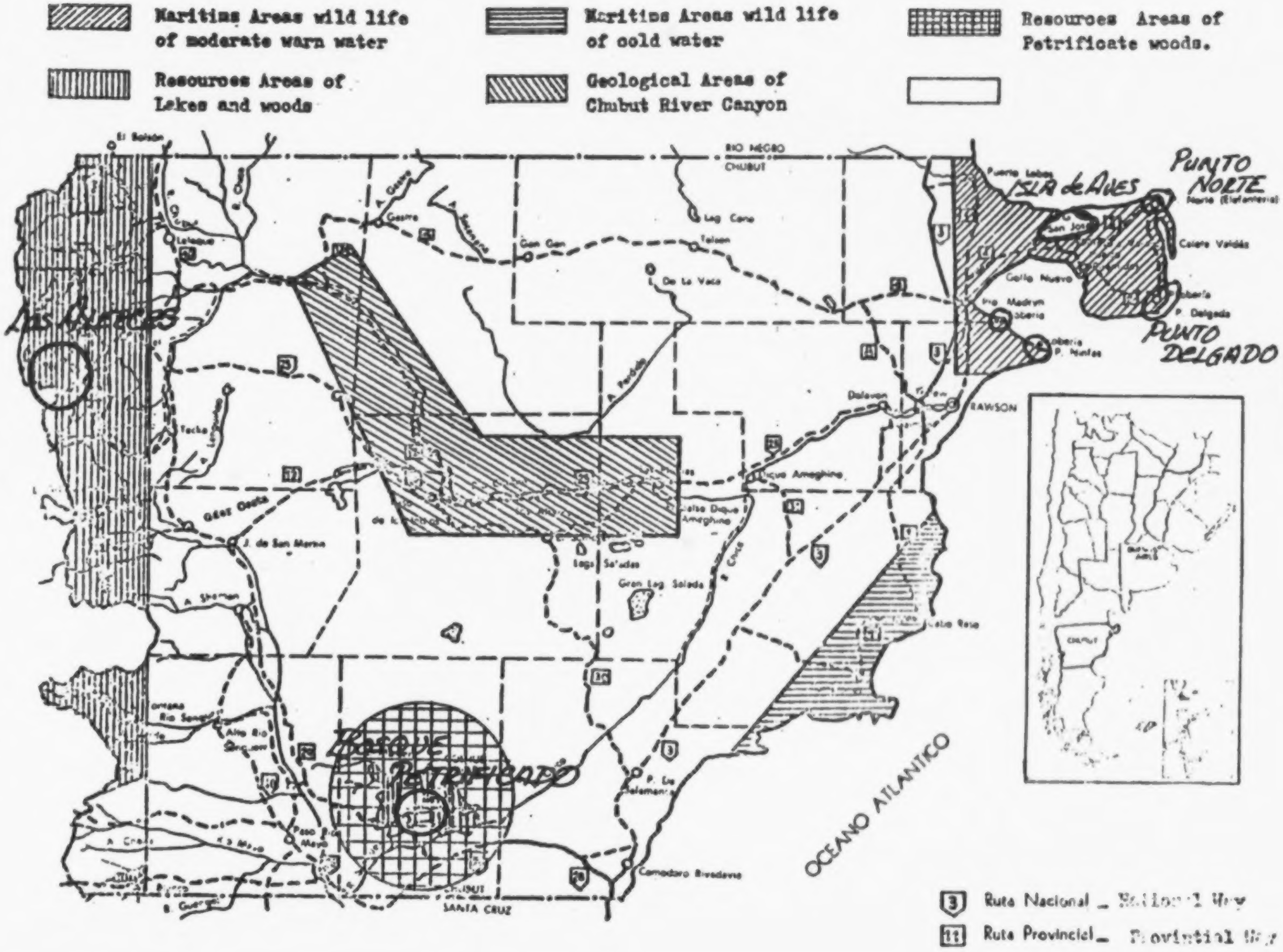


Figure II-38. The wildlife reserves of Chubut Province, Argentina, are located along the Valdez Pennisula and nearby coastal lands. Together they form the attracting force for tourism to the province.

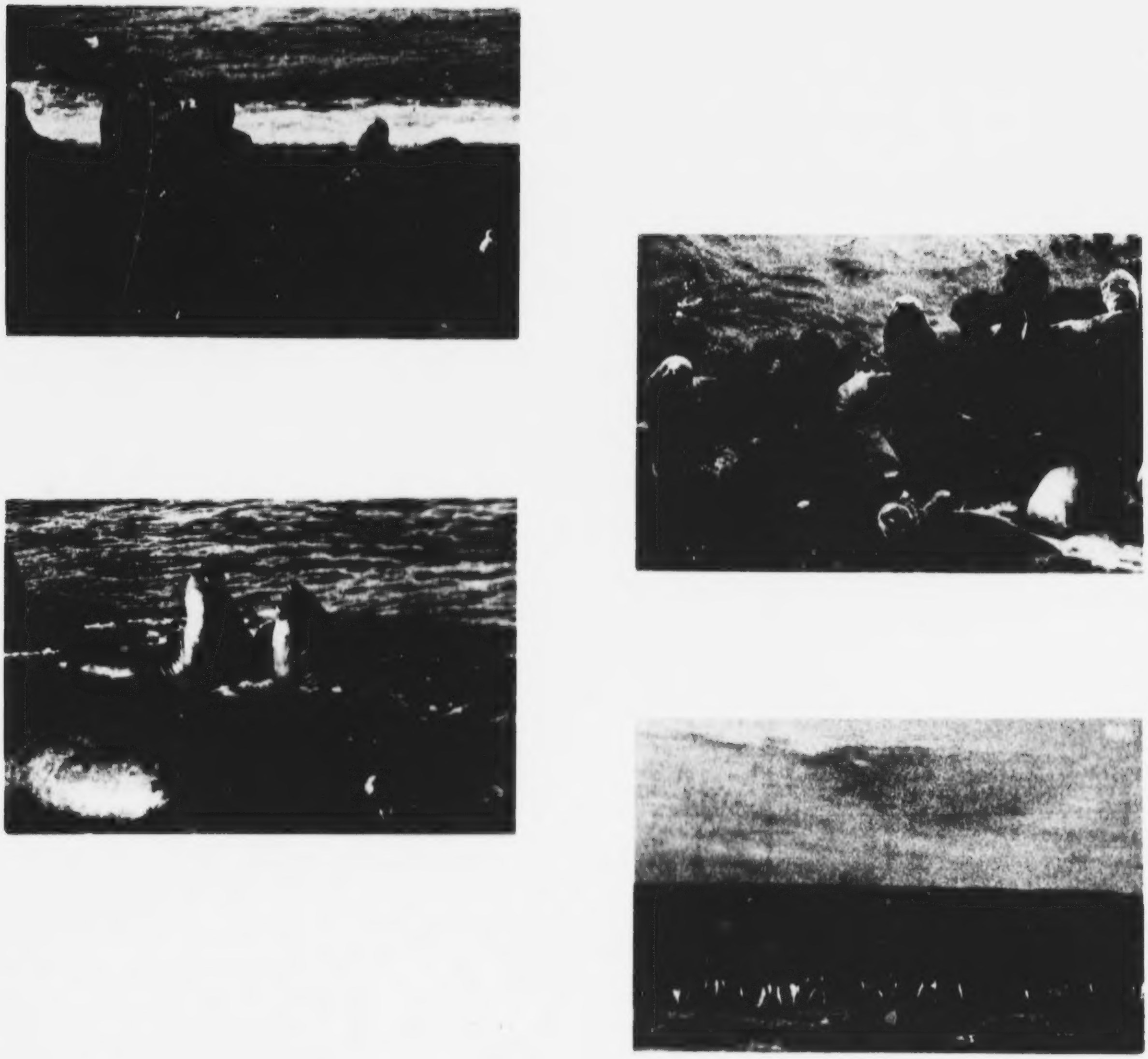


Figure II-39. Visitors to the wildlife reserves of Chubut Province, Argentina, are carefully controlled to avoid negative impacts upon the fauna. The rewards, however, includ incredibly close contact with sea lions, fur seals, elephant seals, and penguins.

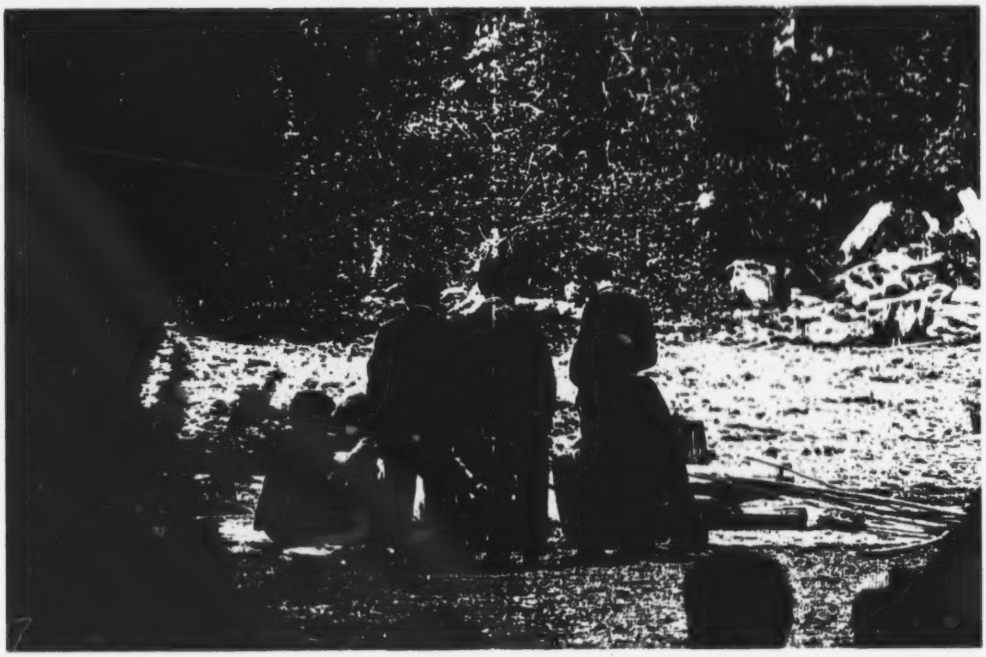


Figure II-40. The "Aguas Calientes Development Area" of Puyehue National Park, Chile was filled by local recreationists during the first season the new facilities were open for use.

Visitation by international tourism to natural areas has increased where governments (and in some cases, private enterprises) have provided services and facilities for visitors in or around parks. The Ecuadorian government established the Galapagos Islands National Park in 1934, but the development of tourism began in the 1960's. Public and private funds have developed a ship-touring system to carry tourists from site to site among the islands. The sites which can be visited are specified in the Master Plan for the park.[70] The travelers sleep and have all meals on board ship. Short guided walks along marked trails provide the opportunity for visitor contact with the exceptional wildlife and scenery. In addition to the expenditures for the ship cruise, the 9,000 visitors per year purchase a special tourist card for entry to the national park from which 70 percent of the income accrues to the national park program.

The Iguazu Falls lie on the border which separates Argentina and Brazil. Both nations have established national parks around the Falls including a total of over 200,000 ha of the surrounding subtropical forests. Walkways along the shorelines and out to prominent viewpoints provide visitors with spectacular encounters with nature and impressively close contacts with the various falls. (See Figure II-41.) Hotels and other facilities are provided within both parks as well as in the towns nearest to the parks. Tourism totaling some 550,000 visitors per year for both parks, reaches up to 8,000 visitors per day to the immediate area of the Falls.[71]

While data are scarce it is possible to draw several conclusions about the role of parks in providing for recreation and tourism. First, as might be expected, visitation to parks increases as infrastructure and facilities are provided. Second, rural and urban peoples of all socio-economic groups already visit those parks which are accessible and provide facilities within economic reach. Third, parks are capable of attracting international tourism where they feature outstanding natural and cultural resources. Finally, the absolute numbers of visitors to parks in Latin America are low when compared to parks in Africa and North America. This is due, in part, to the policies of most park departments to limit access and use of parks according to the level of protection and development which can be provided. There appears to be reticence to promote recreation and tourism to parks because of a lack of capacity to control visitors and protect both the visitors and the resource. This is in no small part due to the observable problems of "over-use" in some local parks as well as others in Africa and North America. On the other side of the same coin, the governments have provided only limited amounts of capital for developments in national parks, perhaps because the rentability of such investments has not been demonstrated.

Support Rural Development and The Rational Use of Marginal Lands

National parks have been utilized as mechanisms to attract and organize the colonization and development of rural lands. Argentina was a pioneer in the employment of national parks as development poles for

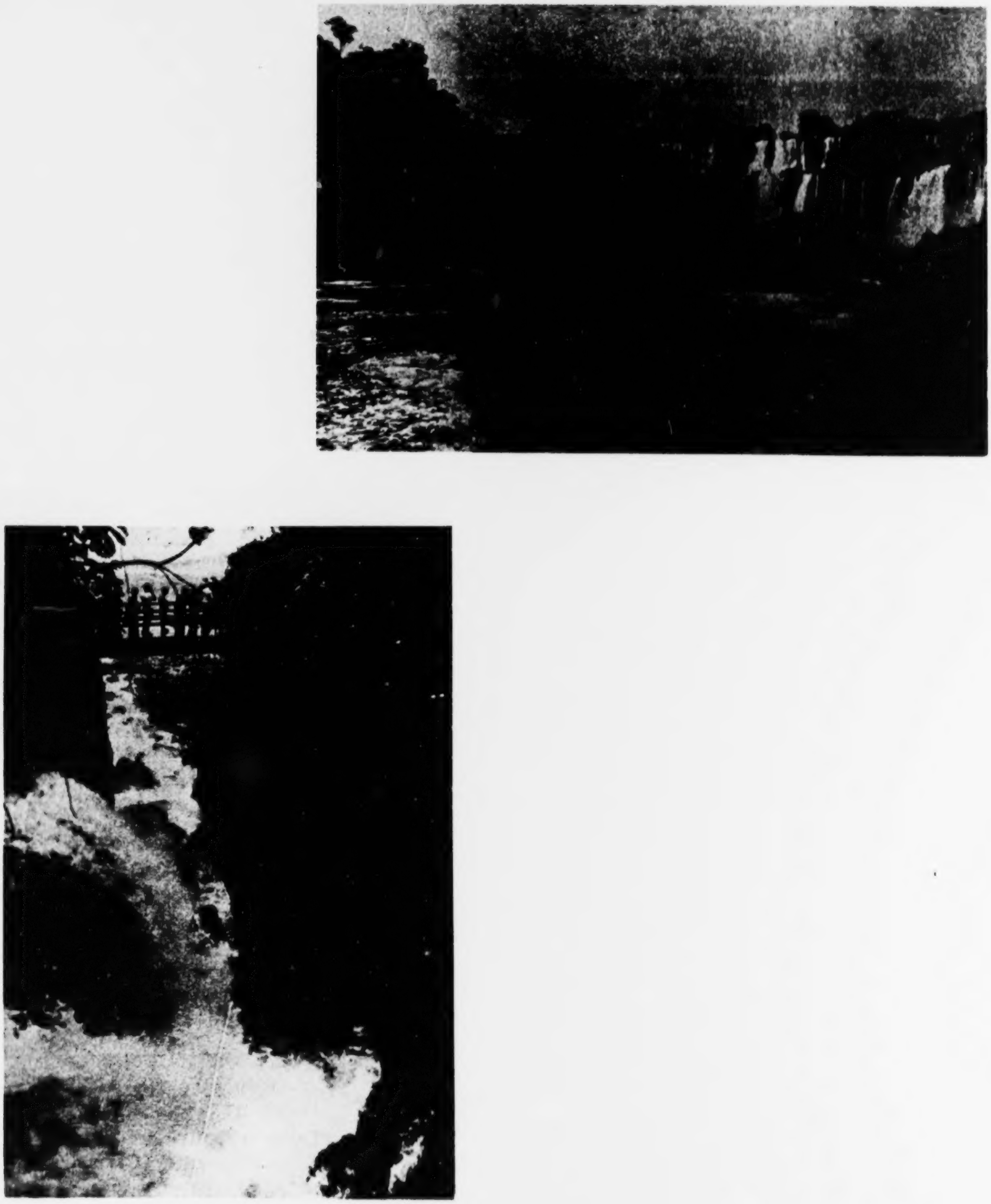


Figure II-41. The Iguazu and Iguaçu National Park of Argentina and Brazil, respectively, have been developed to provide close yet safe contact for the visitor with the many falls and the luxuriant forest.

the orderly and systematic colonization of its frontier lands with Brazil and Chile. (See Figure II-42.) Parks such as Nuhuel Huapi and Iguazu were established along the international borders. The towns of Bariloche and Puerto Iguazu (respectively) were developed to centralize park operations and offices, as well as tourism services, housing, communications and civil functions. In the region surrounding the parks, ranching, farming, timber production and water works were developed.

The parks provided the "attractant" for tourism, the protection of water resources, sites for recreation, opportunities for stable employment, and protection of the scenic resources. In concept, the parks formed the nucleus of the development poles. In the decades following the initial development of these parks many conflicts arose concerning the validity of excluding the timber and pasture lands from commercial and industrial exploitation. Compromises were made in some sectors, but in others the parks were amplified to afford greater protection to vital ecosystems. Some of the towns have now grown into cities, roads have been paved, jet ports have been installed and modern buses connect the parks with population centers around the country. And significantly, as the prices for agricultural crops and animal products have changed from year to year, often resulting in the unemployment of rural labor, the national parks continue to attract ever-greater numbers of visitors. The expenditures of these visitors in the development poles act to transfer income from the generally wealthier urban areas to the generally poorer rural areas.

Other cases where national parks or equivalent reserves have served to support rural development and the rational use of marginal lands include Canaima in Venezuela, the Chubut Provincial Reserves of Argentina, and the Machu Picchu of Peru. These areas have already been mentioned previously for their significance to other ecodevelopment objectives.

The poor, sandy soils of the Upper Caroni river basin and the Gran Sabana region of southeastern Venezuela were studied for their potential productivity in agriculture and animal husbandry. Experiments were run by the Venezuelan Guayana Corporation (CVG) to search for alternative uses of the land. The network of Capuchin missions had considerable experience in the cultivation of fruit trees, bran, vegetables, and livestock. In general, the results showed little promise unless elaborate amounts of fertilizers could be applied.

As already mentioned, the Caroni River supplies the water for the Guri Dam hydroelectric complex at Cuidad Guayana at the confluence of the Caroni and the Orinoco. (See Figure II-10.) Timber resources, gold and diamond attracted development and colonization into the upper Caroni and neighboring rivers. The clearing of land, involving the use of fire, stimulated concern for the future capacity of the river basin to conserve and produce water. The threat of erosion and sediment became quite real.

Apart from the value of the Caroni for hydroelectric energy, the area is considered to be among the world's most interesting biological

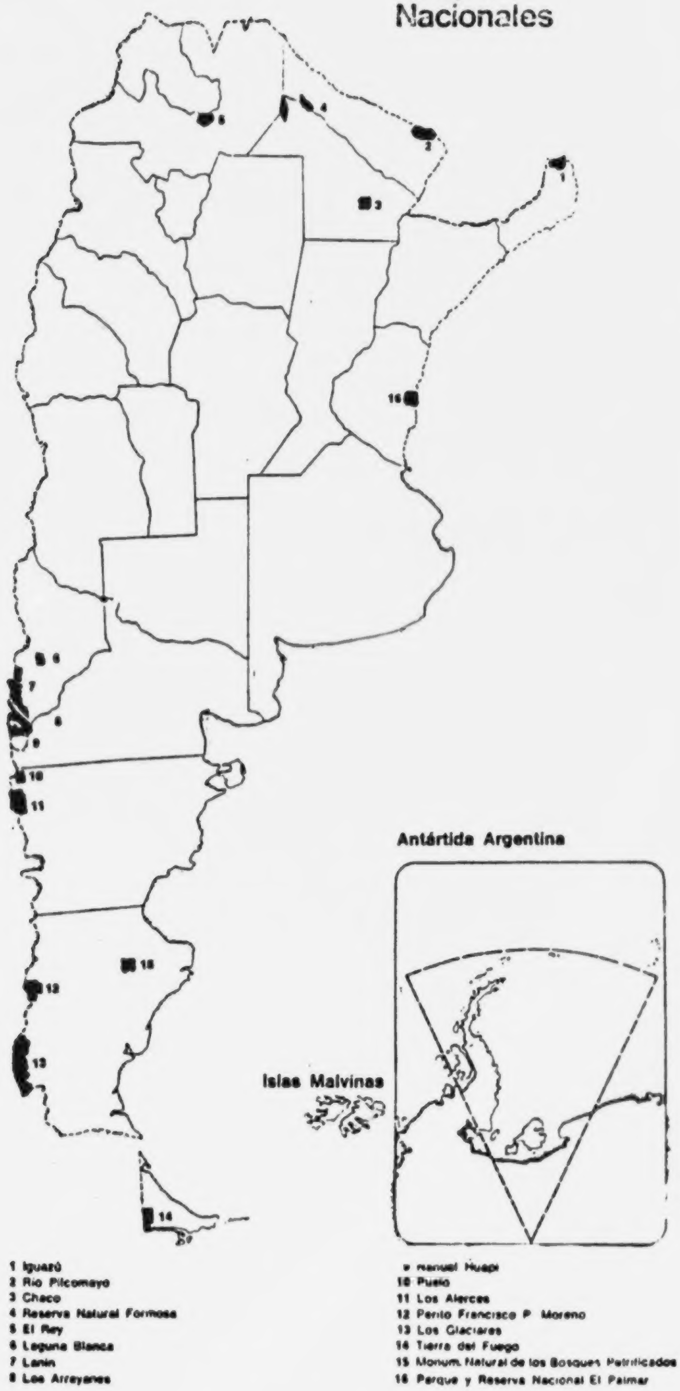


Figure II-42. Many of the early national parks of Argentina were located along its international borders to serve as the nucleui of poles for rural development.

and scenic regions. Concern for the protection of the area has been developing since the early expeditions of the Schomburgk brothers in 1838 and 1842, through the subsequent work of the American Natural History Museum, Felix Cardona, William Phelps, Jr., and many national institutions. The government decreed the Canaima National Park in 1962 with 1,000,000 ha centered around the Angel Falls and nearby tepuis.[72]

Further evaluation of the water resource led the government to expand the park to 3,000,000 ha in 1975. This amplification was based in great part upon the recommendations presented in the management plan for the park.[73] Other efforts to evaluate the implications of various land-use alternatives in the Caroni River basin were carried out by the Venezuelan Institute of Scientific Investigations. Modern methods were utilized to analyze the interrelated systems of natural resources to relate different land management options to erosion and water runoff potential as well as to monetary values.[74]

The case of the wildlife reserve of Chubut Province demonstrates that unique and particularly attractive wildlife can form the nucleus for development in areas where very few other alternatives exist. In the past, cattle, sheep and agricultural development have passed through eastern Patagonia with only short-lived success. The natural resources can be considered marginal to such land uses. The wildlife reserves, however, offer an alternative which requires small amounts of development capital and leaves the resources available for future options.

In Machu Picchu, the cultural monument has been open to tourism for years. A steady stream of visitors has been crossing Peru and penetrating the Sacred Valley of the Inca with little impact upon the surrounding region, save for the tourism services in Cuzco. Currently, the government and Unesco are implementing a regional development plan within which tourism is generating income to be re-invested in rural development.[75] The ruins of Machu Picchu have been further restored and facilities for attending to visitors are being improved. In addition, electric power is being extended throughout the region, highways are being paved, sanitation and education services are being made available, and a school is being developed to train tourism guides. Thus, the ruins left behind by a past generation are serving to inspire and develop the present and future peoples of the region and the world.

Other examples of national parks which function as elements of development poles can be mentioned: Portobelo's historic Spanish fortresses on Panama's Atlantic coast; Tayrona in northern Colombia; Galapagos as a predominant feature in the Provincial Development Plan in Ecuador; Rapa Nui for Easter Island; Torres del Paine and Glaciares for the southern Patagonia region of Argentina and Chile; and the Manu of Amazonian Peru. In all these cases, the objectives are directly related to ecodevelopment. Conservation is not subordinate to development but is a vital part of it. These areas serve development because they conserve resources.

National parks also serve ecodevelopment by converting what are traditionally considered to be "worthless" areas and objects into resources. By the action taken by the Venezuelan government, the sandstone and walled mesas of the Gran Sabana and Caroni basin are apparently of such great value to the nation for the stable production of water and as a natural area, that alternative forms of development have been excluded. The rock bluffs along the ocean shore of Chubut were never considered to be resources until a value was placed on elephant seals. The jagged, forest-covered mountains surrounding the Inca citadel were not valued until the government considered Machu Picchu as a potential major force for the development of the region. Then, suddenly, the maintenance of the scenery surrounding the ruins became necessary and justifiable.

Following 20 years of study and experience in Africa, the Pacific and elsewhere around the world, Thane and Ann Riney urged developing countries to use parks and wildlife reserves as mechanisms to provide stable, ecologically consistent and economically significant uses to lands which are marginal to conventional agriculture and animal husbandry.[76] Their careers have been heavily dedicated to furthering this principle.

From these examples it can be seen that national parks can provide the ecological, economic and institutional framework by which marginal lands can contribute to rural development. From this point of view, "new resources" are added to the national wealth. There is another point of view to be considered in these examples. It is one thing to earn money; it is another to refrain from losing money! By managing the Caroni River basin as a national park, the government of Venezuela is reducing the likelihood of erosion, sediment and siltation in the Guri reservoir as well as the destruction of the turbines and future loss of electric power. A shut-down in the dam would result in inconceivable losses to industry, employment, foreign exchange earnings, and general national welfare.

The cases which have been presented demonstrate the potential which national park management holds for converting marginal lands into positive assets for ecodevelopment. These areas both contribute to development directly, and they also help to avoid losses to the development effort. While these examples are perhaps striking, they are few. The concepts of parks as ingredients in development poles, as mechanisms to rationalize marginal lands and to sustain rural employment are not commonly utilized to justify, design, and implement national parks.

Maintain Watershed Production

The last two objectives to present appear at first glance to overlap one another and to be inseparable from several of the previously discussed objectives. However, both of the two remaining objectives have their particular roles and orientation which warrant consideration.

The national parks of Latin America benefit from the fact that in the majority of cases they have been created by technically trained agronomists, foresters or biologists. Inherent in their design is the inclusion of streams and watersheds wherever possible. Of the 120 national parks accepted by IUCN in 1974, over 50 contained upper watersheds, the majority of which contributed to downstream development and were vital to the maintenance of the natural ecosystem.

Several of these latter parks provide potable water for urban centers. An outstanding example is found in the Guatopo National Park in Venezuela. (See Figure II-43.) The 92,640 ha park was initiated in 1958. At that time some 5,000 families inhabited the valley and parts of the upstream catchment. The water supply for the city of Caracas was becoming unstable due to increasing erosion and the gradually decreasing water-retaining capacity of the watershed. Since 1958, the 5,000 families have been relocated as part of the national agrarian reform effort. The forest is regenerating by natural processes. Investments have been made in works for the collection of water from five streams, recreation and educational facilities, and instrumentation for hydrological monitoring. Several historical sites were restored.

Among the benefits of Guatopo National Park, which relate to all of the previously discussed objectives, 21 cubic meters per second of clean drinking water is produced for the city of Caracas. During the period 1958-1973, the government invested $222 million in the park and water works. The water produced by the park, at the 1973 sale price for water in Caracas, has a gross annual value of approximately $40 million. After deducting the estimated maintenance costs, some $30 million remain to cover the cost of amortizing the capital and to cover interest payments.[77]

The case of Guatopo illustrates well the role of national parks in maintaining watershed production. The area legitimately qualifies as a national park because of its relation to the other objectives. However, because of its location, it also maintains a watershed in a form which is highly productive for ecodevelopment. The water works are minimal within the park and do not appear to conflict with the realization of the other objectives of park management.

This example could serve for many other areas around the region where, inspired by the need for maintaining stable watershed production, natural areas can be managed for this and other objectives at the same time.

Control Erosion and Sediment and Protect Downstream Investments

In the previous objective, parks are located and managed to ensure the flow of water as provided by the natural bio-hydrological system. This is accomplished by maintaining upstream areas in natural cover. Natural regulation is the key concept and management is geared to ensure that natural regulation continues to work.

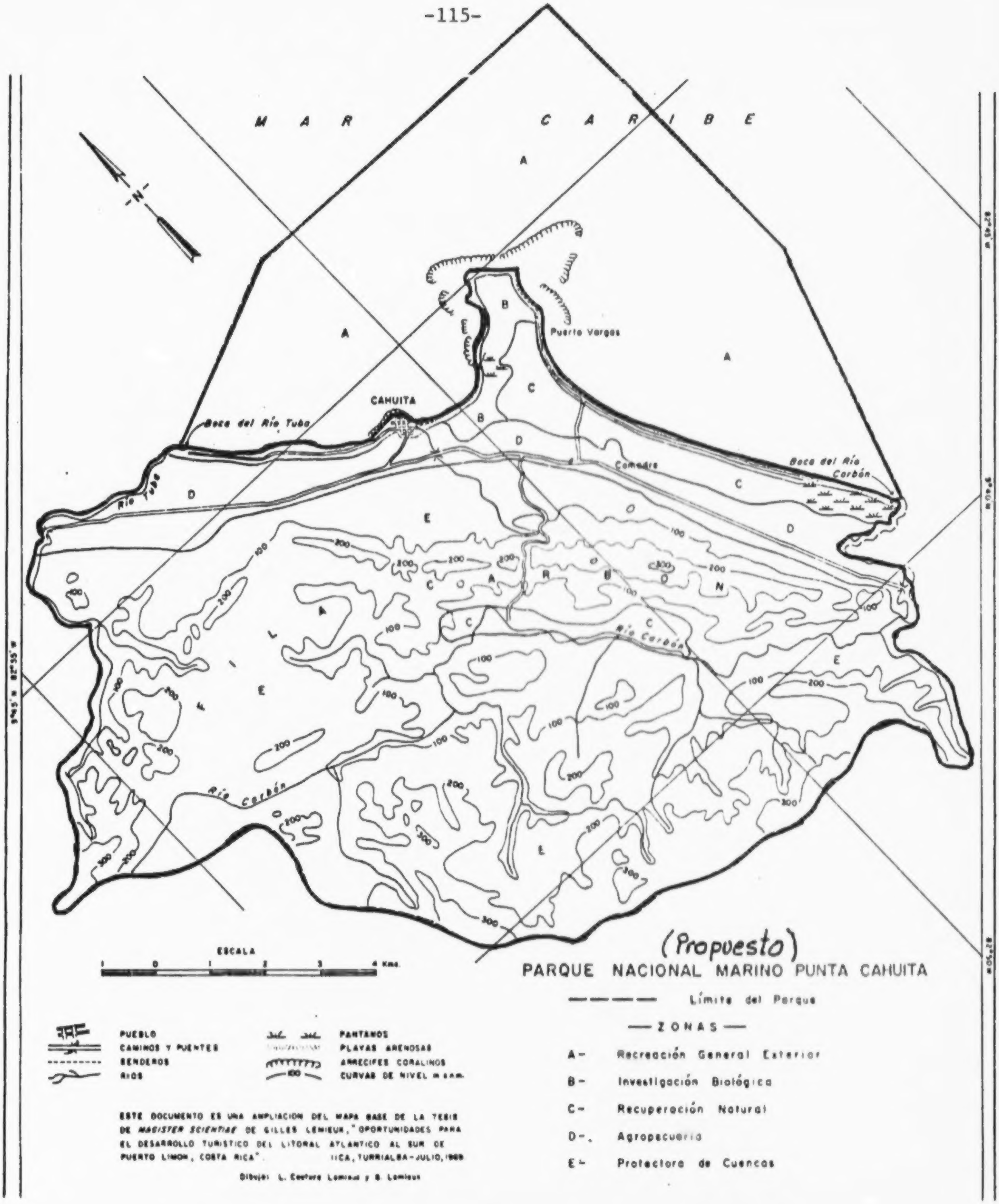
Figure II-43. Guatopo National Park of Venezuela provides the water supply for the city of Caracas. Among the other important benefits derived from this park, it is its watershed function which ties it directly into eco-development.

In this final objective, management may be quite different. Erosion is to be avoided. This requires that highly erosive lands be kept under some stable form of land use which minimizes the possibility of soil movement. For vast areas, the national park can meet the requirement inexpensively since lands kept in a wild state generally provide adequate erosion control. Upstream protection can ensure that downstream areas receive a minimum of sediment. Similarly, mid-stream protection is often vital to the protection of estuarine and inshore fisheries, port facilities, bridges and other capital investments.

The first formal proposal for the Cahuita National Park of Costa Rica recommended the inclusion of an upstream watershed in the park to minimize the potential dangers of sedimentation upon the coral reefs along the Caribbean shoreline.[78] (See Figures II-44 and 45.) As the central feature of the park, the reefs would remain viable only so long as they could retain their delicate balance with the marine environment. The nearby stream carried nutrients and fresh water out over the reefs. Any activities which would provoke above-normal levels of erosion would eventually lead to a decrease in the clarity of the waters and a reduction in sunlight received by the corals. These considerations were important not only from the touristic point of view, but also because of the biological significance of coral reefs in fishery production and in the diets of coastal human settlements.

Upstream-downstream problems also can affect major urban centers. The Avila National Park in Venezuela borders on the city of Caracas. (See Figure II-46.) In the 1940's and 1950's, the slopes of the mountain range facing the city were utilized for goat-grazing and shifting agriculture. With each rainstorm, sediment flowed into the city streets clogging the drainage and sewage systems. Fire ravaged the mountain sides and often passed down into the edges of the city. And, the scenic backdrop for the city became more and more unaesthetic. As part of a concerted effort to correct the social and economic ills of which this situation was witness, the national park department was empowered to reclaim the mountain slopes from the peaks down to the municipal limits. A decade of work on soil and vegetative management and the careful control of fire improved the condition of the slope to such an extent that erosion and sediment are under control and the scenic curtain for Caracas is greatly improved. In the longer-run, this slope will play a more active role in relation to the other objectives for park management, but at present its main contribution is to reclaim and protect a major portion of the Caracas basin.

The objective to control erosion and sediment and to protect downstream investments can be observed in other areas besides Cahuita and Avila. Where national parks are involved, this objective is generally accomplished by management activities oriented to maintain ecosystems, ecological diversity and genetic resources. But the objective is not to be taken passively. Its consideration was critical in the analysis of Cahuita. It served to provide a highly valued service for the city of Caracas. Viewed in these terms, there are opportunities remaining where parks could serve to protect downstream investments which are critical to national development. Parks can serve not only to keep water flowing, which was the concern of the previous


M A R C A R I B E
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(Propuesto)
PARQUE NACIONAL MARINO PUNTA CAHUITA
Límite del Parque
— Z O N A S —
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B - Investigación Biológica
C - Recuperación Natural
D - Agropecuaria
E - Protectora de Cuencas
PUEBLO
CAMINOS Y PUENTES
SENDEROS
RIOS
PANTANOS
PLAYAS ARENOSAS
ARRECIFES CORALINOS
CURVAS DE NIVEL m s.n.m.
ESTE DOCUMENTO ES UNA AMPLIACION DEL MAPA BASE DE LA TESIS DE MAGISTER SCIENTIAE DE GILLES LEMIEUX, "OPORTUNIDADES PARA EL DESARROLLO TURISTICO DEL LITORAL ATLANTICO AL SUR DE PUERTO LIMON, COSTA RICA". IICA, TURRIALBA - JULIO, 1969
Dibujo: L. Couture Lemieux y G. Lemieux

Figure II-44. The proposal for Cahuita National Park, Costa Rica, recommended that the upstream catchments of the rivers which drain near the coral reefs be included within the park. In this way, minimal sediment loads on the coral reef area and also minimal turbity could be insured.

Figure II-45. Streams flowing from forested mountains and lowland swamps, such as those entering the Caribbean in Cahuita National Park, Costa Rica, carry nutrients vital to coral reef and fishery productivity. These same streams, however, can carry sediments which cover the reef animals and cloud the sea waters thereby reducing the penetration of sunlight required for photosynthesis by the associated algae.

Figure II-46. The Avila National Park in Venezuela has played a major role in the control of sediment into the city of Caracas. The mountain slope facing the city now provides a more aesthetic backdrop for the great urban center.

objective, but also to keep it free of physical materials which eat away at the hard-won capital expended by the nation in irrigation, power, sanitation, navigation, and water purification works. And, the upstream-downstream effect reaches directly into the problem of human food supplies. The maintenance of valley agriculture and estuarine and inshore fisheries can often be ensured to some considerable degree by the management of the upstream areas of influence in national parks. The analysis and implementation of these considerations have only been scratched on the surface in Latin America and elsewhere.

Political Fvolution of the Park Concept in Latin America

The significance of the national park as an important instrument to achieve ecodevelopment has been presented based upon a review of examples selected from around the Latin American region. It is apparent from these examples, and from many more which could be presented, that considerable activity is underway. Many of the benefits potentially available from national parks are being received. There are many others which have yet to be recognized and produced.

Aside from the technical problems which confront park managers in this effort, there are serious political obstacles. First of all, national parks have been associated with a very restricted set of objectives. If parks are not related to a full range of benefits which can be identified by governments and the general citizenry as important to human well-being, support for park management can hardly be expected. And if parks and park departments are not organized to pursue a wide range of objectives, then there is little hope that parks will contribute fully to conservation and development.

Second, the task and responsibility for the management of national parks has been traditionally placed in the hands of a relatively small public institution with limited scope in the political life of the nation. While it is recognized that park management can most appropriately be carried out by forest, park and wildlife departments, there is need for inter-institutional coordination and cooperation with other departments of government, universities, civic and youth groups and research stations. This can lead to broad involvement in park management and provide mechanisms by which parks can support more fully the needs of humans and the human habitat.

Cooperative activities involve university professors and their students doing research in the parks to support management decisions, education and science. Experiment stations may wish to correlate their work on agriculture with natural plots in the park. Pharmaceuticals will be screened. Genetic materials for coffee, cocoa, timber trees and various other plants and animals will be inventoried. Recreation will tie into regional and urban welfare plans. Tourism circuits will involve elements in the park. Upstream catchments will be added to the park area to place them under the protective umbrella. Highways will bypass key natural areas, and power lines may have to skirt the park.

Open, round-table discussion among institutions is required. What were implicit tenets of conservation must become explicit guidelines for management and development. The efforts of Dasmann, Milton and Freeman in "Ecological Principles for Development Planning,"[79] and the IUCN in "The Role of Ecological Principles for Development of the American Humid Tropics"[80] are major steps forward.

Full political maturity of wildland management and national parks requires that they be institutionally involved in regional and national planning. Conservation must be recognized as a tool of development. Progress to this end is illustrated by examining several recent policies and international decisions.

The Colombian "Statute on the Reservations of the National Park System"[81] represents one of the first explicit statements of what government expects from national parks and how it expects them to be managed. The law establishes norms and procedures for addressing the following objectives:[82]

a) Regulate by technical criteria, the management and use of the reservations which make up the national park system.

b) Protect and study the wild fauna and flora of the nation.

c) Conserve and administer the natural values of the country.

d) Reserve representative areas to ensure the perpetuation of the nation's primary ecosystems.

e) Establish natural genetic banks.

f) Stimulate the development of new and improved techniques for the conservation and utilization of renewable natural resources.

g) Promote and restore wildlife.

h) Investigate the values of the nation's renewable natural resources.

The statute covers definitions of different conservation units, zones, development areas and other management terminology.

Article 14 establishes a conservation mandate, in direct managerial language.[83]

> "To INDERENA as administrator of the Reservations which make up the National Park System, in conformity with the above cited objectives, corresponds among others the following functions:
>
> a) Regulate by technical criteria, the management and use of the Natural National Parks, Biological Reserves, Wildlife Territories, Unique Natural Areas, Florestas Nacionales, Wild Fauna Sanctuaries, Wild Flora Sanctuaries and Parkways.

b) Conserve, restore and develop the wildlife of the Reservations of the National Park System.

c) Protect and study the wild fauna and the flora of the country.

d) Conserve and administer the natural values of the Nation.

e) Perpetuate the primary representative ecosystems of the country.

f) Establish natural genetic banks.

g) Approve, supervise and coordinate programs implemented by other national institutions and organizations which relate to the Reservations of the National Park System.

h) Contract technical specialists (individual and corporate) as necessary and appropriate for the study, development and use of the Reservations of the National Park System.

i) Regulate the control of wildlife in the Reservations of the National Park System.

j) Ensure the compliance of all current legal dispositions concerning environmental contamination which may affect the wildlife of the Reservations of the National Park System.

k) Prepare master plans for the respective Reservations of the National Park System.

l) Implement interpretative activities related to the natural motifs of the Reservations of the National Park System.

m) Prepare the requirements for the Reservation and legal establishment of areas which are to become part of the National Park System.

n) Develop the Reservations of the National Park System as set forth in the respective master plans.

o) Prepare statistical information on the various aspects of the Reservations of the National Park System.

p) Regulate, authorize and control the use of equipment, methods and periodicity of research activities in the Reservations of the National Park System.

q) Guard the Reservations of the National Park System.

r) Ensure the compliance of all goals and objectives which have been established for each Reservation of the National Park System.

s) Regulate all types of public use of the Reservations.

t) Manage the hydrological, forest, floristic, edaphic and faunal resources of the Reservations of the National Park System.

u) Establish safety and first aid services as required by the visitors to some areas of the Reservations of the National Park System.

A policy for the management of Chile's national parks was prepared, approved and published during the rapidly evolving and uncertain political context of the early 1970's.[84] How were the national parks to serve the nation as overall goals and strategies were changing? Were the parks to operate in a vacuum, to shift with the different policies of each government? Perhaps more appropriately, the national park officers are to participate in the formulation of related policies for any government of the nation.

The policies for Chile's parks are technical, yet based upon ecological and socio-economic criteria. They are designed "to facilitate management which is adequate to preserve the physical and environmental values on a perpetual basis, to stimulate and provide the facilities for the study of said values and their interrelationships in order to establish guidelines for the management and development of natural resources and to develop recreation and education services in harmony with the environment."[85] Significantly, the policy is signed by the Minister of Agriculture and the Executive Director of the National Forestry Corporation (CONAF).

Emphasis is given to the duty of the State to protect the nation's natural and cultural heritage. National parks are seen as elements of a national system of areas. The system is to be primarily focused upon goals of conservation, research, education and recreation. And, specific guidelines are given in relation to the management and use of resources, and public use of the areas.

Of particular interest is the section on management and development plans which is presented integrally:[86]

Management and Development Plans

A. General Concepts

Management and development planning for the areas of the park system involves a delicate process of decision-making, especially since it relates to a broad range of unique natural and cultural resources including forests, grasslands, deserts, watersheds, mountains, coasts, wildlife, archeological ruins and genetic reserves, which are to be studied and analyzed and about which decisions are to be made concerning the most appropriate use.

It is indispensible that the support of all professionals related to the theme is achieved. They must form interdisciplinary planning teams which integrate the various facets of the work into management plans.

B. Management Plans

The management plan is a document which guides and controls the management of an area and directs the design of more-detailed programs for management and development. In this way the management plant should be utilized as a working document to orient and facilitate all activities to be implemented in an area, and it should be subject to modification only as new information is obtained. However, all changes shall be made within the scope, context and overall continuity of the plan.

1. Participants: Specialists from such subjects as flora, fauna, geomorphology, geology, ecology, anthropology, archeology, design, construction, economics, sociology and other related fields as dictated by the resources of the particular area, are to participate.

2. Contents: The management plan states the current uses and values of the resources of the area, their relation with the surrounding region, the human requirements to be addressed, the management objectives and zoning classification of the area, and a general plan of action including a base map and a series of conceptual management and development maps. (Details are given on zoning, the management program and site development.)

C. Development

The basic principle to consider in the development of the areas of the system is that the effects produced or caused by man should be subordinate and designed as part of the natural environment where they are to be located.

The design of developments should be processed concretely through an environmental impact analysis. In this way, all installations will support the related activities without compromising unduly the natural resources. The installations should be developed under standards and norms of design and construction which have been prepared specifically for the areas of the system and stipulated in the approved plans.

In general, only those installations which are necessary for the management and administration of the area and for the use and enjoyment of the public will be developed. Such development will take place only in the sites assigned in the approved management plan.

Installations for public lodging or for staff housing which are particularly large or which compromise the natural landscape or other values of the area, will be located on sites outside of the park boundaries.

Both statements of policy make explicit reference to parks as elements of a greater wildland context. All provide for the preparation of planning documents for each conservation unit to be approved and utilized in guiding and directing all management and development activities.

With the technical cooperation of the FAO/UNDP Regional Project on Wildland Management and Environmental Conservation, a working document was prepared in Costa Rica on "Systems and Policies for Wildland Management."[87] The document addresses the problem of planning and managing wildland areas in a systematic and orderly manner. Based upon similar fundamentals of wildland management as those presented in Chapter I, the document proposes a system of eleven land management categories for the country. In this way it would be possible for professional land and resource managers to apply uniform policies of management for obtaining the desired products and services, utilize common terminology,and improve communication and control of land management situations.[88]

The characteristics, principal objectives and policies for each management category are suggested. Policies for the national park category are presented in greater detail. However, of greatest interest is the decision-making process suggested for selection of the appropriate category for a given area;[89] either

a) "The government can decide on which products and services are needed from the wildlands and the planners then choose the most suitable management category that satisfies the needs in accordance with the land capacity." or

b) "The government can implement a comprehensive land use plan and then produce the optimum quantity and combination of goods and services according to the suitability of the wildlands, and assign the different management categories according to each area's productive potential."

These efforts to evolve more modern and useful policies for parks and wildlands took place within a context in which national economic and social development programs were beginning to consider entire geographical regions, such as the Andean countries, Central America and Panama, the La Plata River Basin and the Caribbean nations. Regional and world-level organizations have given specific consideration to the national park as a tool of land use and resource management. For example, the FAO Regional Conference in August 1974, in Panama City, called for increasing work on the environmental aspects of rural development with specific reference, in Resolution 8(b), to the need for systems of national parks and various types of reserves.[90]

The Meeting of Ministers of Agriculture from the Amazonian countries, held in Cali, Colombia in April 1975, formulated the "Cali Declaration" -- the conceptual framework for the development of the American Tropical region.[91] The Ministers insisted that such development requires "the execution of structured plans that guarantee the coordinated participation of the various sectors of the economy," and also underlines the necessity of two basic activities: 1) knowledge of the environment with an evaluation of the existing natural resources, and 2) the formulation of a new philosophy for the integral and integrated use of such resources. Their interpretation of these concepts is further clarified where they considered the essential conditions for the implementation of such plans:

a) Intersectorial and interagency coordination that harmonize with the countries' efforts.

b) Intensify public and promote private action, keeping in mind social as well as economical and technical criteria.

c) Educate and create consciousness among the public so that these concepts may be applied to guarantee the conservation of the ecosystems.

d) Reconfirm the will to recognize the native communities' right to share in the development process.

e) Promote coordinated action among countries in such fields as investigation, conservation and preservation of natural resources.

f) Exchange information and technologies.

The First Technical Meeting on National Parks, Management and Conservation of the Amazonian Biota was held in Leticia, Colombia in August 1975,[92] and recommended to the respective governments that bilateral and multilateral agreements be established to coordinate the protection marketing, management and development of the renewable natural resources; that relevant legislation be exchanged; that laws be standardized to conform to the "Convention of the International Commerce of Endangered Species of Wild Flora and Fauna, which each country is urged to ratify; that endangered and economically important species be given priority for research and that qualified personnel be exchanged; and, that projects to establish and manage conservation units be coordinated with special emphasis on the development of border conservation units.

In Central America and Panama, the integration of the conservation of natural and cultural heritage resources with development was initiated in December 1974 when delegates from the six countries met in San Jose as guests of the Costa Rican Government.[93] The meeting was unusual for two key reasons: First, four delegates were chosen by each country to represent the ministries responsible for natural resources, tourism, culture and central planning. The four delegates from each country came as a team and they presented a single, country document prepared by them in collaboration with colleagues from other institutions (e.g., education, geographic institute, forestry, etc.) on an integrated basis. Second, the meeting was cooperatively sponsored, supported and attended by international governmental and non-governmental organizations as well as bilateral agencies and private foundations (FAO, IUCN, Rockefeller Brothers Fund, SIDA, UNEP, Unesco, and the World Wildlife Fund). Under these circumstances, the meeting considered many aspects of regional integration, and placed the management of wildlands as an integral element in this region-wide effort.

Among the resolutions of the meeting, the delegates requested technical cooperation from the FAO Regional Project on Wildland Management and Environmental Conservation, to help plan the management and development of a "pilot park" in each country to serve as a training exercise for the national teams and to serve as demonstration areas where all governmental bodies would focus their financial and manpower resources. In addition, the Meeting requested that the Regional Project guide the establishment of a permanent regional committee which in turn would coordinate program activities and the use of local expertise and would integrate conservation into the development process. The IUCN, UNEP, Unesco and other interested organizations were requested to support these and related efforts.

The country teams, local experts and FAO officers from the Regional Project initiated work immediately on the planning of the "pilot parks." (The Workshop on Planning Methodology for National Parks, held in Guatemala in November 1974, just prior to the San Jose Meeting, served to standardize planning procedures.) And, a draft project document was prepared by the Central American group to request extended technical and financial cooperation for the six nations from the United Nations.

The enthusiasm and dedication of the delegates and the governments is noteworthy: Within 90 days an official project request for extended assistance to Central America on an integrated basis was in the United Nations Development Program headquarters in New York. In less than twelve months, management plans had been written and published for each of the "pilot parks."[94] In addition, the previously mentioned document on policy for wildland and park systems was prepared in response to the request of the Government of Costa Rica.

A Second Central American Meeting on the Management of Natural and Cultural Resources was held in Managua, Nicaragua from 1-3 December 1975.[95] Significantly, the delegates referred to the discussions held in San Salvador in 1975 by the Central American Ministers of Agriculture concerning the deterioration of natural and cultural resources.[96] Whereas, resolutions had been presented by a multitude of meetings in Latin America concerning the need to conserve natural resources, the Central American Ministers of Agriculture Meeting in San Salvador in 1975 made specific reference to the integration dimension of natural resources and development and the need for methods which will "permit the benefits of comparability and of coordination and cooperation among the countries."

The Second Central American Meeting established a Provisional Central American Committee and provisional multidisciplinary working group (technical and scientific) to prepare draft programs at the national level for the integration of resource conservation with the function of national planning. The seeds were planted for the establishment of a permanent "Regional Committee for the Conservation of the Natural and Cultural Heritage of the Central American Isthmus" (Resolution 2 and 5), a tie with the Central American Bank for Economic Integration (BCIE) (Resolution 8), and very importantly, the establishment of ties with the Permanent Secretariat for the General Treaty for Central American Economic Integration (SIECA) (Resolution 7).

Similar efforts to coordinate and integrate resource conservation and development among groups of nations are in motion in the Andes, the Amazon and the Caribbean. Of interest is the explicit recognition which has been given by governments to the role of national parks as an element in national and regional development. This is no longer a case of "conservation or development," but of "development with conservation."

APPENDIX II-A

CONVENTION ON NATURE PROTECTION AND WILD LIFE PRESERVATION IN THE WESTERN HEMISPHERE

PREAMBLE

The governments of the American Republics, wishing to protect and preserve in their natural habitat representatives of all species and genera of their native flora and fauna, including migratory birds, in sufficient numbers and over areas extensive enough to assure them from becoming extinct through any agency within man's control; and

Wishing to protect and preserve scenery of extraordinary beauty, unusual and striking geologic formations, regions and natural objects of aesthetic, historic or scientific value, and areas characterized by primitive conditions in those cases covered by this Convention; and

Wishing to conclude a convention on the protection of nature and the preservation of flora and fauna to effectuate the foregoing purposes, have agreed upon the following articles:

ARTICLE I

Description of terms used in the wording of this Convention.

1. The expression NATIONAL PARKS shall denote:

Areas established for the protection and preservation of superlative scenery, flora and fauna of national significance which the general public may enjoy and from which it may benefit when placed under public control.

2. The expression NATIONAL RESERVES shall denote:

Regions established for conservation and utilization of natural resources under government control, on which protection of animal and plant life will be afforded in so far as this may be consistent with the primary purpose of such reserves.

3. The expression NATURE MONUMENTS shall denote:

Regions, objects, or living species of flora or fauna of aesthetic, historic or scientific interest to which strict protection is given. The purpose of nature monuments is the protection of a specific object, or a species of flora or fauna, by setting aside an area, an object, or a single species, as an inviolate nature monument, except for duly authorized scientific investigations or government inspection.

4. The expression STRICT WILDERNESS RESERVES shall denote:

A region under public control characterized by primitive conditions of flora, fauna, transportation and habitation wherein there is no provision for the passage of motorized transportation and all commercial developments are excluded.

5. The expression MIGRATORY BIRDS shall denote:

Birds of those species, all or some of whose individual members, may at any season cross any of the boundaries between the American countries. Some of the species of the following families are examples of birds characterized as migratory: Charadriidae, Scolopacidae, Caprimulgidae, Hirundinidae.

ARTICLE II

1. The Contracting Governments will explore at once the possibility of establishing in their territories national parks, national reserves, nature monuments, and strict wilderness reserves as defined in the preceding article. In all cases where such establishment is feasible, the creation thereof shall be begun as soon as possible after the effective date of the present Convention.

2. If in any country the establishment of national parks, national reserves, nature monuments, or strict wilderness reserves is found to be impractical at present, suitable areas, objects or living species of fauna or flora, as the case may be, shall be selected as early as possible to be transformed into national parks, national reserves, nature monuments or strict wilderness reserves as soon as, in the opinion of the authorities concerned, circumstances will permit.

3. The Contracting Governments shall notify the Pan American Union of the establishment of any national parks, national reserves, nature monuments, or strict wilderness reserves, and of the legislation, including the methods of administrative control, adopted in connection therewith.

ARTICLE III

The Contracting Governments agree that the boundaries of national parks shall not be altered, or any portion thereof be capable of alienation, except by the competent legislative authority. The resources of these reserves shall not be subject to exploitation for commercial profit.

The Contracting Governments agree to prohibit hunting, killing and capturing of members of the fauna and destruction or collection of representatives of the flora in national parks except by or under the direction or control of the park authorities, or for duly authorized scientific investigations.

The Contracting Governments further agree to provide facilities for public recreation and education in national parks consistent with the purposes of this Convention.

ARTICLE IV

The Contracting Governments agree to maintain the strict wilderness reserves inviolate, as far as practicable, except for duly authorized scientific investigations or government inspection, or such uses as are consistent with the purposes for which the area was established.

ARTICLE V

1. The Contracting Governments agree to adopt, or to propose such adoption to their respective appropriate law-making bodies, suitable laws and regulations for the protection and preservation of flora and fauna within their national boundaries, but not included in the national parks, national reserves, nature monuments, or strict wilderness reserves referred to in Article II hereof. Such regulations shall contain proper provisions for the taking of specimens of flora and fauna for scientific study and investigation by properly accredited individuals and agencies.

2. The Contracting Governments agree to adopt, or to recommend that their respective legislatures adopt, laws which will assure the protection and preservation of the natural scenery, striking geological formations, and regions and natural objects of aesthetic interest or historic or scientific value.

ARTICLE VI

The Contracting Governments agree to cooperate among themselves in promoting the objectives of the present Convention. To this end they will lend proper assistance, consistent with national laws, to scientists of the American Republics engaged in research and field study; they may, when circumstances warrant, enter into agreements with one another or with scientific institutions of the Americas in order to increase the effectiveness of this collaboration; and they shall make available to all the American Republics equally through publication or otherwise the scientific knowledge resulting from such cooperative effort.

ARTICLE VII

The Contracting Governments shall adopt appropriate measures for the protection of migratory birds of economic or aesthetic value or to prevent the threatened extinction of any given species. Adequate measures shall be adopted which will permit, in so far as the respective governments may see fit, a national utilization of migratory birds for

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the purpose of sports as well as for food, commerce, and industry, and for scientific study and investigation.

ARTICLE VIII

The protection of the species mentioned in the Annex to the present Convention, is declared to be of special urgency and importance. Species included therein shall be protected as completely as possible, and their hunting, killing, capturing, or taking, shall be allowed only with the permission of the appropriate government authorities in the country. Such permission shall be granted only under special circumstances, in order to further scientific purposes, or when essential for the administration of the area in which the animal or plant is found.

ARTICLE IX

Each Contracting Government shall take the necessary measures to control and regulate the importation, exportation and transit of protected fauna and flora or any part thereof by the following means:

1. The issuing of certificates authorizing the exportation or transit of protected species of flora or fauna, or parts thereof.

2. The prohibition of the importation of any species of fauna or flora or any part thereof protected by the country of origin unless accompanied by a certificate of lawful exportation as provided for in Paragraph 1 of this Article.

ARTICLE XI

1. The original of the present Convention in Spanish, English, Portuguese and French shall be deposited with the Pan American Union and opened for signature by the American Governments on October 12, 1940.

2. The present Convention shall remain open for signature by the American Governments. The instruments of ratification shall be deposited with the Pan American Union, which shall notify their receipt and the dates thereof, and the terms of any accompanying declarations or reservations, to all participating Governments.

3. The present Convention shall come into force three months after the deposit of not less than five ratifications with the Pan American Union.

4. Any ratification received after the date of the entry into force of the Convention, shall take effect three months after the date of its deposit with the Pan American Union.

ARTICLE XII

1. Any Contracting Government may at any time denounce the present Convention by a notification in writing addressed to the Pan American Union. Such denunciation shall take effect one year after the date of the receipt of the notification by the Pan American Union, provided, however, that no denunciation shall take effect until the expiration of five years from the date of the entry into force of this Convention.

2. If, as the result of simultaneous or successive denunciations, the number of Contracting Governments is reduced to less than three, the Convention shall cease to be in force from the date on which the last of such denunciations takes effect in accordance with the provisions of the preceding paragraph.

3. The Pan American Union shall notify all of the American Governments of any denunciations and the date on which they take effect.

4. Should the Convention cease to be in force under the provisions of Paragraph 2 of this article, the Pan American Union shall notify all of the American Governments, indicating the date on which this will become effective.

IN WITNESS WHEREOF, the undersigned Plenipotentiaries, having deposited their full powers found to be in due and proper form, sign this Convention at the Pan American Union, Washington, D.C., on behalf of their respective Governments and affix thereto their seals on the dates appearing opposite their signatures.

RESERVATION MADE AT THE TIME OF SIGNING

The Representative of Argentina signs the present Convention with the following reservation:

Existing resources in national parks may only be exploited for commercial purposes in those regions which, despite their lack of the characteristics necessary to be considered national parks, have been incorporated into the system solely to maintain a uniformity of action in those areas, and when such exploitation will not be contrary to the general purpose of the law which established them, and the exploitation is sufficient to maintain the principle of regional development according to the needs of each country.

Source: Unión Panamericana. Secretaría General, Organización de los Estados Americanos. Serie Sobre Tratados No. 31. Washington, D.C. 1964. pp. 7-12.

APPENDIX II-B

CONVENTION ON NATURE PROTECTION AND WILDLIFE PRESERVATION IN THE WESTERN HEMISPHERE, 1940

Nations which have acted on the Convention as of August 1976

Nations which have Signed and Ratified:	Year
Argentina (with reservations)	1946
Brazil	1965
Costa Rica	1967
Chile	1967
Ecuador	1944
El Salvador	1941
Guatemala	1941
Haiti	1942
Mexico	1942
Nicaragua	1946
Panama	1972
Peru	1946
Dominican Republic	1942
Trinidad and Tobago	1969
United States of America	1941
Uruguay	1970
Venezuela	1941
Nations which have Signed only:	
Bolivia	1940
Colombia	1941
Cuba	1940

Source: Organization of American States. Washington, D.C. 1976.

APPENDIX II-C

CRITERIA FOR NATIONAL PARKS PREPARED BY THE IUCN INTERNATIONAL COMMISSION ON NATIONAL PARKS, BANFF, CANADA 1972

First, a national park must have the necessary legal status which establishes it as a permanently protected area. And, this legal protection must be given by the highest competent authority having jurisdiction over the territory.

Second, in addition to legal protection, the park must have actual on-the-ground protection. This in fact means that the park must have sufficient budget and personnel to manage the area and all of the activities which take place within its boundaries in accordance with the objectives of the park. Generally, remote, little-visited areas will require less budget and personnel than areas near to population centers. Several guidelines are suggested:

> If parks are located in a region where population density is less than 50 inhabitants per square kilometer:
>
> > Minimum of 1 person working full time at the management and supervision of 10,000 ha;
> >
> > Minimum of (US) $50 spent annually for the management and supervision of 1,000 ha.
>
> If parks are located in a region where population density is higher than 50 inhabitants per square kilometer:
>
> > Minimum of 1 person working full time at the management and supervision of 4,000 ha;
> >
> > Minimum of (US) $100 spent annually for the management and supervision of 500 ha.

Third, within the park a minimum surface area of 1,000 contiguous hectares must be dedicated to conservation of a representative sample of the biotic unit in its natural state. Zones of the park which are dedicated to recreation, administration (headquarters, staff housing, etc.), are to be excluded from this minimum area. Exceptions to the 1,000 ha are made for island parks and sites of extremely unusual biotic interest.

Fourth, "exploitation" of natural resources must be prohibited. Exploitation is considered to include the removal of mineral resources, timber and other vegetation, and animal life, or the development of dams or other structures for irrigation or hydroelectric power. Also to be prohibited are agricultural and pastoral activities, hunting, fishing, lumbering, mining, public works construction for transportation, communication, power, etc., and residential, commercial or industrial occupation. Some expectations to this criteria are contemplated:

a) In those parks and related reserves where zones have been established to protect cultural heritage, it will generally be necessary to include managed agricultural or pastoral landscape zones, villages, towns or urbanized areas of historical or archeological interest, which will form an integral part of the complex to be protected.

b) Normally, sport fishing and sport hunting are to be excluded from national parks. However, sport fishing in wilderness areas has been a traditional practice in many countries and may be acceptable within explicitly designated zones so long as the natural aquatic fauna is well represented in the scientific or intangible zones of the park.

It is recognized that within the boundaries of some national parks there exists villages, towns, communications networks and the many activities associated with them (apart from those referred to under paragraph (a) above). The criteria require that these areas do not occupy a significant part of the park area and that they do not disturb the effective protection of the remaining portions of the park.

Similarly, private rights for agricultural, pastoral or mining activities or residential purposes may be allowed to continue where they occupy a small part of the total area. The criteria are clear, however, that these rights should not be permanent and that their termination should be arranged integrally as part of the management plan of the park.

The fourth criteria stresses that the control of exploitation must be rigidly enforced.

Fifth, and finally, there are activities to be considered which are necessary for the management and administration of the area and for its development in relation to the objectives of the park. Among the activities which are considered to be acceptable are:

a) The construction and maintenance of a road network; the setting aside of areas for public accommodation, along with the related gardens, recreation facilities and related services. These facilities and services should not be scattered throughout the park, but rather should occupy a restricted area. Furthermore, they should be located in areas which have been explicitly zoned for this purpose, and preferably, they should be located outside the park.

b) Those facilities and services which are required for the actual management and administration of the park, including staff housing, offices, access roads, gardens, etc., should be restricted to a minimum and explicitly zoned area.

c) Significantly, this fifth criteria recognizes that the maintenance of certain natural communities or stages of plant succession will require that manipulative activities be employed. These activities may include the removal of animals to maintain population levels, the removal of certain species of vegetation, and the use of controlled burning or grazing.

Source: Adapted from 1974 United Nations List of National Parks and Equivalent Reserves. IUCN, Morges. pp. 15-21.

APPENDIX II-D

DECLARATION OF PRINCIPLES ON POLICY FOR NATIONAL PARKS, FAO LATIN AMERICAN FORESTRY COMMISSION QUITO, 1970

1. Increasing demands placed upon natural resources, especially for the land surface area itself, require that representative areas of unique natural, scientific, historic and scenic value be set aside and managed as National Parks and Equivalent Areas.

2. The general objectives of National Parks and Equivalent Areas can be stated as follows:

    a) to manage and preserve the natural, physical and environmental features in such a manner as to ensure the perpetuity of their existence and values;
    b) to provide for the study of the mentioned characteristics in order to guide resource management and development both within the park and elsewhere, and to obtain more fundamental information about natural ecosystems;
    c) to provide opportunities for public education regarding a park's value; and
    d) to offer recreation services for public enjoyment of a park's values as open-air museums, and the wonders of a natural environment free of man's dominant earth-shaping influence.

3. The benefits derived from the management of National Parks and Equivalent Areas include clean regulated water flow, gene reservoirs, soil stabilization, and flora and fauna preservation. Emphasis should also be placed upon public education, research and recreation. These in turn help provide for rural economic development through tourism and research expenditures and through the creation of employment and investment opportunities.

4. Through a review of a nation's ecological systems and areas of outstanding scientific, historic and scenic features, it is recommended that at least one sample of each ecosystem and outstanding area be set aside for management as a National Park or Equivalent Area for perpetuity.

5. Sites chosen for management as National Parks or Equivalent Areas should include the most unique and outstanding features of natural and national significance. The system should embrace the diversity of natural features to be found in the country, and repetitions of sites with similar features should be avoided as much as possible.

6. The size of National Parks and Equivalent Areas must be sufficiently extensive to include complete natural ecological units. This is important to safeguard the unique values of the area in the face of land use conflicts adjacent to the Park,

and to support education, research and recreation activities.

7. To ensure the permanence of National Parks and Equivalent Areas, it is preferable that they be established by law from the highest legislative body in the nation, rather than by decree or proclamation.

8. While it is often difficult and time-consuming to negotiate for and acquire lands, all lands within National Parks should eventually be under public government ownership.

9. The material utilization of forest, mineral, soil or other elements is not compatible or consistent with the objectives of National Parks or their management.

10. Research is a fundamental element of Park management programmes from which guidelines for the management of resources, both within the park and in surrounding areas, can be derived and upon which the interpretation of the Park's values can be based.

11. Education through interpretative programmes can be of major importance in influencing public attitudes on such issues as resource management, natural beauty, wildlife conservation and environmental problems. In this connection, conservation education should be provided at all levels in school systems and through the public media in which the key issues on resource management and environment are stressed.

12. Recreation services in National Parks and Equivalent Areas, such as camping, hiking, picnicing, nature study, swimming, and the like, provide the general public with a healthy constructive means of utilizing leisure time while gaining an appreciation of the natural environment.

13. National Parks and Equivalent Areas can form viable focal points for the development of tourism and contribute significantly to economic development. It is essential, however, that such developments, and recreation activities in general, are consistent with the overall management objectives.

14. The management of National Parks and Equivalent Areas should be divided into two general types of activities:

    a) First, provisions should be made for the adequate protection and administration of the area, and for the research which is related to the support of management planning and future interpretive programmes.
    b) Second, provisions should be made for the development of public recreational facilities once ecological information, national budgetary resources and public demand warrant such investments.

15. Park management planning requires that adequate consideration be given to the sociological, ecological and economic aspects of the area on a multi-disciplinary basis.

16. It is necessary that Park management planning provides for systematic and incremental development to ensure proper consistency among the protection, research, education and recreation activities of the Park.

17. In addition, Park management planning requires a thorough analysis of the present situation and projections for future development for the region surrounding the Park. Such aspects as transportation, agriculture, timber management, power and water developments, and tourism, require close liaison with regional planning organizations, and participation in inter-agency development programmes.

18. Following adequate study, it is useful to designate land use categories or zones within and around Parks to guide and emphasize the particular management objectives of each area, as well as the practices and techniques required to accomplish these desired ends.

19. Park programmes require technically trained personnel with special experience in such aspects as the management, planning, administration, interpretation, research, protection, maintenance, engineering and design. Budgetary provisions must provide for staff training at professional and sub-professional levels, and for sufficient remuneration and career opportunities to attract and hold high-quality individuals.

20. The stable and efficient operation of a Park system requires that the agency in charge has considerable autonomy, and be supported by sufficient budgetary resources on a long-run basis.

Source: FAO. Final Report, Eleventh Meeting of the Latin American Forestry Commission. Quito, Ecuador. 1970. pp. 7-9.

APPENDIX II-E

NOTES ON THE 1974 IUCN SYSTEM FOR CLASSIFYING NATURAL REGIONS FOR PURPOSES OF CONSERVATION

The 1974 IUCN is first divided into BIOME types, a class derived from the work of Clements and Sheford[97] and is characterized by a prevailing regional climax vegetation and its associated animal life. The principle BIOME TYPES[98] are:

Tundra and related communities
Temperate needle-leaf forest or woodland
Temperate/subtropical rain forest or woodland
Temperate broad-leafed forest or woodland
Mediterranean forest/scrub or woodland
Tropical dry or deciduous forest (including monsoon
    forests) or woodland
Tropical humid forests
Mixed mountain/highland systems
Tropical savannahs and grasslands
Temperate grasslands
Warm deserts or semi-deserts
Mixed island systems.

The BIOME is a unit which is easily utilized in natural areas when the actual vegetation conforms to the expected climax formation. Where the vegetation is in disclimax, especially where man-induced or man-maintained, such as the case of many savannahs, it is difficult and of little use to classify the area for its former climax. The BIOME is a very useful starting point, however, since by focusing upon natural communities and climax communities, it provides the conceptual framework within which further detailed sub-division can be given to species and taxonomic differences.

Secondly, IUCN suggests[99] that the BIOMES be separated by "bio-geographically-determined continental sub-divisions." Furthermore, major floral and faunal differences are then subdivided. Thus, the regional and sub-regional biomes are separated into BIOTIC PROVINCES[100] which:

> are distinguished by vegetation, flora or fauna. The physiognomy of the prevailing climatic climax vegetation is the first basis of recognition of a biotic province. Within the area of a physiognomically defined formation, however, the presence of a distinctive flora or fauna will serve to delineate the provincial boundaries. Similarly, within an area of relatively uniform flora or fauna, a marked change in vegetation will indicate a provincial boundary.

The preliminary map of this system as it relates to the Latin American region, is presented above in Figure II-1. Dasmann and IUCN both realize that the map is very preliminary and they urge all specialists from around the region to improve the details wherever they have more complete information. Moreover, details within each biotic province become especially complicated where mountains and islands are involved. Over very short distances such as in the Andes, the Sierra Nevada de Santa Marta of Colombia, and the Galapagos Islands, large changes in flora and fauna occur. The Holdridge LIFE ZONE system of classification[101] has definite advantages, especially where life zone changes occur within few linear kilometers, e.g., from high-altitude paramo, through temperate forests, sub-tropical forests, tropical rain forests, or even semi-desert and desert formations, along one continuous slope. The Holdridge system is widely used in Latin America and is an important tool to classify lands within biotic provinces and to specifically delineate altitudinal variation.

The national parks of Latin America (as of 1974)[102] are listed by biotic provinces in Table II-3, above. The table was derived by transposing the geographic location of each park system upon the map of biotic provinces.

Source: Dasmann, R.F. Biological Conservation. Towards a system for classifying natural regions of the world and their representation by natural parks and reserves. 4:247-255. 1972.

Dasmann, R.F. A system for defining and classifying natural regions for purposes of conservation. A Progress Report. IUCN Occasional Paper No. 7. Morges, 1973.

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4. Ibid. p. 26.

5. ____. p. 26.

6. ____. p. 27.

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12. Ibid. pp. 7-8.

13. International Union for the Protection of Nature (IUPN). Rue Montoyer 42, Brussels. 1948.

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22. Ibid.

23. Ibid., pp. 19-28.

24. IUCN. 1971. United Nations List of National Parks and Equivalent Reserves. Ed. H. Elliott. IUCN Publ. n.s. 15. Hayez, Brussels.

25. IUCN. 1962. Proc. First World Conference on National Parks, Seattle. 30 June-7 July. U.S. Department of the Interior, Washington, D.C.

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27. Buchinger, M. op. cit.

28. IUCN. 1969. Proc. X General Assembly, New Delhi. IUCN Publ. n.s. Supplementary Paper 27. Morges.

29. Ibid., Resolution No. 1.

30a. IUCN. 1972. Proc. XI General Assembly, Banff, Canada. September. IUCN Publ. n.s. Supplementary Paper 40E. Morges.

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31. FAO. 1964. Proc. IX Meeting of the Latin American Forestry Commission, Curitiba, Brazil. Rome.

See also: Proc. X Session, Port-of-Spain, Trinidad and Tobago, 1967; XI Session, Ouito, Ecuador 1970; and XII Session, La Habana, Cuba, 1976.

32. FAO. 1970. Proc. XI Meeting of the Latin American Forestry Commission. III Session of the Working Party on National Parks and Wildlife, Quito, Ecuador, 11-12 November. Rome.

33. IUCN. 1962. Proc. First World Conference on National Parks. op. cit. Recommendation No. 26. p. 385.

34. CLAPN has held working sessions (Jornadas) in Caracas, Venezuela, 1967; Viña del Mar, Chile, 1969; Quito, Ecuador, 1970; Medellin, Colombia, 1971. Note particularly the Cartas de Noticias, 5 April 1977 and March 1976, and its attachment.

35a. Dasmann, R.F. 1972. Towards a system for classifying natural regions of the world and their representation by natural parks and preserves. Biological Conservation. 4: 247-255.

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36a. IUCN. 1974. Biotic Provinces of the World. Further development of a system for defining and classifying natural regions for purposes of conservation. IUCN Occasional Paper No. 9, Morges. (A contribution to Unesco's MAB Project No. 8.)

36b. The work on classification of natural areas continues. IUCN subsequently published a proposal by M.D.F. Udvardy which has received acceptance from FAO, IUCN, UNEP and Unesco:

Udvardy, M.D.F. 1975. A Classification of the Biogeographical Provinces of the World. IUCN Occasional Paper No. 18, Morges. (A contribution to Unesco's MAB Project No. 8.)

37. IUCN. 1974. United Nations List of National Parks and Equivalent Reserves. op. cit.

38. IUCN. 1974. Biotic Provinces of the World. op. cit. p. 7.

39. Exceptions occur in Nahuel Huapi and Los Glaciares (Argentina), Volcan Poas (Costa Rica) and Avila and Henri Pitier (Venezuela) where heavy recreation and tourism visits to particular areas within these parks cause internal conflicts with the objective of maintaining the natural ecosystems.

40. Exceptions include: the hydroelectric dam in Alerces (Argentina), high-tension power lines across Salamanca Island (Colombia), tourism highway penetrating and crossing the scientific zone of Tayrona (Colombia), the attempted highway across the Sierra Nevada (Venezuela), the helicopter tourist services into the canyon of Iguazu

and Iguacu (Argentina and Brazil), the cutting of hay in Santa Rosa (Costa Rica), the nuclear research center and a hydraulic model dam in Miguel Hidalgo (Mexico), the colonization in La Macarena (Colombia); the road across Santa Cruz in the Galapagos (Ecuador), etc.

41. Exceptions include: the return of lands to former private owners in the barely initiated Galletué National Park of Chile, and the opening of certain parks to agrarian reform in Mexico. Some few other parks have had temporary or short-term confusion or uncertainty, but most were retained or reaffirmed as national parks.

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46. Parque Nacional Canaima. Plan Rector. 1974. Corporación de Turismo de Venezuela y el Ministerio de Agricultura y Cría. Ed. R. Gondelles. Caracas. pp. 190-192.

47. The author wishes to acknowledge the many facts and ideas utilized in this section from a draft book by Norman Myers tentatively entitled: "Ten Million Species".

48. See Norman Myers' draft Chapter II, op. cit.

49. See reference 39, above.

50. This work is being accelerated by the marine programmes of IUCN and WWF and by the "Regional Seas" programmes of the United Nations Agencies.

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CHAPTER III

PLANNING NATIONAL PARKS FOR ECODEVELOPMENT IN LATIN AMERICA

Introduction

National parks can play an important role in ecodevelopment. They can contribute to the realization of a nation's scientific, ecological, economic and political objectives. The examples given in Chapter II demonstrate that current programs in Latin America are beginning to focus upon national conservation and development goals. Parks are passing from the status of optional luxuries which serve only limited sectors of the citizenry, to a status which intimately relates to the welfare of humankind. Parks are being shown to be useful for the maintenance of the human habitat and natural and cultural heritage.

However, if parks are to play an important role in ecodevelopment they must be given the serious attention assigned to other fundamental public enterprises. Parks are elements of human welfare, related to education, a part of energy, linked to food and agriculture, tied inseparably to the economy and a store-house and recycling center for the human spirit.

While the survey of the role of national parks presented in Chapter II indicates that considerable efforts are being made in Latin America to put parks firmly into the national development process, it is also clear that there is much left to be done. On the one hand, there are important natural and cultural resources set aside as national parks and other reserves in most countries of the region. Conservation activities and various facilities are already functioning in many of these parks. The challenge in these cases is to organize and focus existing personnel and resources upon the key objectives for conservation and development.

On the other hand there are outstanding natural and cultural resources which have yet to be placed under some type of protective management. While some established areas are without budgetary support, others urgently require additional management activities and personnel to avoid the loss of irreplaceable resources. In these cases the challenge is to demonstrate that investments in park programs are contributions to ecodevelopment.

The directors and staff of such public enterprises as transportation, energy, power and health, generally possess two traits in common: they think in terms of the future and they evaluate past performance. In order "to look ahead" and "to learn from past experience" personnel must focus their attention upon the key issues: "What is to be accomplished?" "How can it be done?" This requires an examination of individual details as well as an integral view of the self-criticism. It also puts the user on the offensive, because he gains confidence in his footing and knows where he is heading (at least as well as others, and better than most). Planning park management can take managers off the full-time defensive positions and place them in leadership roles -- out confidently advising other government bodies in solutions for regional development rather than meekly decrying the near extinction of endangered species.

In Latin America, national parks have been planned under a variety of circumstances. The prevailing concept of planning is that a specialist prepares a plan which contains text, maps, engineering and architectural drawings and economic calculations. It is presumed that the planning will tell everyone concerned "what to do, when, and how." Generally, planning is believed to be something done by others. Furthermore, it is considered to be theoretical and often impractical, mystical and abstract.

Contrary to these general concepts and attitudes about park planning, this chapter will try to demonstrate that the planning of national parks for ecodevelopment cannot be realized by individual specialist planners for four reasons: First, the methods and techniques required for understanding and allocating the natural and cultural resources of a park area are found not within any one simple traditional discipline. Second, ecodevelopment requires that parks carry commitments for the maintenance of ecosystems, genetic materials and watersheds, and the provision of research and monitoring services related to the long-run productivity of the human habitat. This makes park management dependent upon the efforts and talents of a broad spectrum of people from many walks of life. And third, it is the manager of the park who is responsible for meeting park objectives. To understand natural and cultural resources, enhance and maintain them appropriately, and insure that they fulfill their role in eco-development, the manager must know how his park functions. The park planning exercise provides an outstanding opportunity for the manager to learn about management. Fourth, few specialist planners can pretend to understand and grasp the significance of local features and attitudes. Where a park is being planned in which local staff exist, the local personnel can contribute invaluably to the preparation of the plan.

In many developed countries national parks have been incorporated into patterns of land use, the legal system, public institutions, curricula of universities and into the general values of the people. Along with other dimensions of development, specialization of functions and individuals is common. In the national parks departments, there are planners, interpreters, designers, park architects, park rangers, park protection specialists, etc.

In contrast, developing countries are forming national parks as one element among many urgent aspects in the development process. The high variability of conditions and situations most often calls for generalists. Park personnel must do something of everything. They must survey wildlands, read and understand ecology, lay out roads and trails, build cabins, supervise personnel, greet visitors and politicians, administer a budget, work with law and policy, seek funds for new equipment and supplies, and write readable monthly reports.

The central challenge of park management is to understand the nature and function of natural and cultural resources, to care for them and put them to use in ways which provide humans with benefits unique to these resources and at the same time ensure that these resources will continue to work for humankind on a sustainable basis. This is a large order. It is not just another job, a days wages, something to do. Park personnel are being asked to be custodians of an important part of the nation's natural and cultural capital. If they choose to accept this challenge and take the offensive, national parks can contribute in a substantive and realistic way to ecodevelopment. If the contrary choice is made, it is doubtful whether the development effort will assign an important role to national parks unless antional parks or other similar landuse methods are employed successfully to manage outstanding natural and cultural heritage resources, humankind runs the risk of losing these resources, and the many benefits associated with development will be perpetually deprived of this lost wealth.

This chapter will present key fundamentals for assisting the park manager and planner in park planning. The emphasis differs from other materials on park planning due in great part to the premise that parks must be planned as elements of ecodevelopment. Also, the focus is upon developing countries, and in particular, those in Latin America. Furthermore, these fundamentals are based upon considerations from the economic, engineering, management, natural and social sciences. No attempt will be made here to review and synthesize all of the related literature, scientific models and technology. It is assumed that the reader with deep interest and experience in the underlying sciences will be tolerant and patient in this attempt to formulate a simple and integrated statement of planning principles. It is intended that the bibliography at the end of the book serve to guide the interested reader to further information.

The presentation will begin with a review of the characteristics and basic steps for planning. Then, seven principles will be given which are designed to assist the manager and planner in transforming general conservation objectives into practical directives for action; gathering field information on the areas to be planned; resolving conflicts for the use of space within the parks; establishing the boundaries for parks; designing management programs; analyzing and evaluating proposals and alternatives; and establishing priorities for implementation. These principles will be further elaborated in subsequent chapters which deal directly with planning park units, park systems and strategies for the implementation of national park systems.

Characteristics of Planning

Several questions require the consideration of park managers when entering the planning process. Why plan, for whom are the plans to be made, who will do the planning, what is to be planned, and when are plans to be made?

Plans are made because the manager wishes to set goals and to map out alternative routes which promise to lead to those goals. The process of planning consists of many long hours of deliberations, discussions and arguments about the pro's and con's of different goals and means. There are many technical solutions, policy implications, and points of view. The manager, who ultimately must take responsibility for the decisions, needs to know the advantages and disadvantages which can be expected to accompany each of several alternative means. Potentially, all members of his staff can contribute to this analysis. He then needs to contemplate the conflicts which his means may raise with other activities of the park department, other sectors and organizations in the country. And, planning documents are to be shared with any and all who wish to participate and support the planning process.

Ultimately, plans are important because they provide a mechanism by which past successes and failures can guide future decisions. They represent a record of past decisions, and of the criteria which were followed.

Plans are made for people. They are made to help people to understand their options, to help them make choices, and to guide them in following a specified course of action. Plans are not for parks (they can't read)! Plans are written to communicate among people. Therefore, planning deliberations must consider who is to read and act upon the plan.

A second aspect of the question, "for whom are plans made," relates to the people to be affected by the course of action suggested by the plan. Often plans are prepared for the use of small technical-professional groups and those people to be affected by the plan are kept unaware of the plan which is probably written in a language which is unintelligible to them anyway. Experience demonstrates that only the full participation of related professionals and local citizens can ensure the long-run harmonious development of the park within its peculiar context.

Traditionally, plans are prepared by technically trained individuals working alone or in groups. More recently, teams of technical and non-technical personnel have blended together their criteria to form interdisciplinary methods for park planning.

Experience has been realized in Latin America with individual, group and team approaches to planning. The INDIVIDUAL planner generally consults others, discusses his ideas, and reviews the facts. But, ultimately, he alone writes and submits the plan. In the optimum case, the individual planner is a generalist who knows when his own knowledge and experience is insufficient and where to obtain appropriate advice. The individual approach is valid when it is necessary to transfer technology and methods to new places, or to attain a planning document quickly to meet development schedules or political objectives. The individual planner is a very effective means when local planning capacity is scarce, when planning tools are to be employed which are not available locally, or when time does not permit the preparation and fielding of a local planning mission.

Individual planners may be local citizens or foreign. Generally, the local planner will tend to be more acquainted with local conditions and the institutional context. The foreign planner may have the handicap of little experience in the local climate, culture and institutional context, and may or may not possess more tools or experience in their application. Foreign planners are generally sought where a more "international viewpoint" is desirable, or where freedom from local interests is imperative. Often, it is simply a case of not having the expertise available locally, and the planner must be imported. Or, while a local planner may be available, funds may not be available locally to employ him. International cooperation may then be necessary to hire a foreign expert.

The planning GROUP approach consists of several individuals from various disciplines. They work together, each individual being held responsible for a particular section of the task according to his specialization. This approach has the advantage of involving distinct points of view, and of avoiding an overly generalized approach to very specific technical problems. The civil engineer will design the roads; the ecologist, the management of habitats; the watershed management specialist, the protection of watersheds. Characteristic of most group plans is that each chapter of the final report is a distinct entity, prepared by an individual with a specialized language and point of view. On occasion, the several chapters will be integrated, with some sort of introduction and summary at the beginning, and a final prescriptive section dealing with conclusions and recommendations. A major danger lies in the diversity of the values of the individuals which make up the group. The net result can include a contradictory set of recommendations.

The TEAM approach to planning also consists of several individuals from various disciplines. It differs from the group in that the individuals sacrifice their individual territories of expertise to form an integrated whole. Basically, all members of the team look into all and any aspect of the planning problem. And, critically, each member participates in the design of all aspects, invading where appropriate the so-called field of expertise of all other members. Naturally, the civil engineer's word will carry more weight on aspects of road design, but he does not act in isolation. His suggested solution to transportation problems meets with the critical opinion of the other team members. His colleagues do not expeditiously agree with his suggestions only because they do not understand his technical field. Rather, it is the responsibility of all members to achieve a reasonable level of understanding of the details which they are approving. An additional characteristic is important in distinguishing the GROUP from the TEAM: in the TEAM approach, the decisions of the members are taken on a CONSENSUS basis -- all members must agree on all aspects of the plan. If there is disagreement, then more work is necessary to achieve understanding. To pass over details in the name of majority rule or expediency is to run the risk of major errors of design or omission.

The central axis of team planning is the participation of the team members in all aspects of the exercise, as well as the participation of those who will manage the resource, those who will use the resource and those to be affected by the plan. In the practical arena of park planning, this means that park planners work together with personnel from all levels of management, scientists, recreationists, educators, and with rural peoples living in and around the area. Does this not make the mob more difficult, complex, political and unending? Yes. The fastest way to get a plan is to do a one-man job, and a strictly confidential one. However, the objective of the exercise is only partially "to produce a park plan."

Examples and references to actual experience in individual, group and team planning will be given in Chapters IV through VII. The question of participation will form part of a larger discussion on management capacity in Chapter VIII. It is sufficient to conclude here that although it is the manager who must ultimately take decisions, to the extent that he is supported by other levels of management, other professions, and government officers and private citizens, his decisions are likely to be more complete and sensitive to most of the relating factors.

Questions on "what to plan" are too often characterized by a minimum participation of management personnel, a minimum of integration with other professions and organizations, and little systematic planning with respect to other activities. Generally, a SPACE has already been "decreed" a national park; the planning assignment is to "prepare a plan for the park." Similarly, the decision may be to "plan a campground," an "interpretative exhibit" or "electrical system." These examples beg other questions: "By what criteria was the area designated a park?" "How is it logical that its boundaries were fixed before the management plan was made?" "Can a campground be planned before the overall management of the area is analyzed?" "Who says camping is necessary anyway?" Matters become even more complex and out-of-phase when details are being planned, such as exhibits and power lines, before the larger issues are discussed.

The planning takes place in TIME. Theoretically, there is an optimum time to plan. Planning too early may produce results which are obsolete when finally utilized. Premature plans employ background information which may be out of date by project execution. Conversely, if planning is done late, work tends to be hastily prepared; and worse, the decision-makers may have already made up their minds. A late plan may have very little influence upon decisions.

There is an optimum SEQUENCE for planning each element of a national park. It is logical to plan the management of the area before discussing its physical development. Once the management concept provides the basis for selection of actual sites for specific activities, then physical development can be considered in greater detail. Finally, questions of road design, ranger cabin location, and tourism facilities can be discussed. Unfortunately, it is most common to find plans and developments being executed on details, such as roads and hotels, prior to analysis of the resources and the formulation of a management concept. This is "cart before the horse" planning.

Commonly, tourism development is initiated before the conceptual management plan has been written. This is the "tail wagging the dog." When an aspect of planning is realized out of logical timing, all other aspects of planning will be predicted by the premature move. The tourist hotel which is installed before the plan for the park has been written, will irreversibly determine the location of many additional facilities and the routing of roads. The illogical nature of such a situation is parallel to deciding upon location of a sawmill and the dimensions of the finished lumber to be cut before analyzing if there are sufficient quantities of logs available in the correct size, and if so, can the logs be economically transported to the mill, and the lumber to the consumer?

Each planning effort can be considered from TACTICAL and STRATEGIC points of view. First, there are the considerations which are directly related to a specific area, site or building. Such TACTICAL considerations are generally focused upon the accomplishment of a specific activity. The second point of view considers the relationship of the specific activity to overall goals. Such STRATEGIC considerations focus upon the larger dimensions of planning, they look to the future, to interrelationships, policies and implications of the particular activity upon long-term objectives.

Within any strategic plan there are tactical elements. For example, the nation may choose to have as one of its conservation strategies "the protection of a representative sample of each of the nation's major biological units." Tactically, this translates into the selection of individual sites and the design of their individual management plans. At a higher level, the community of nations may choose through some international program that "the relationship of the pollution of the world's oceans to oxygen production requires urgent study and monitoring." This strategy for international cooperation implies tactical elements for each cooperating nation; each country will consider ways and means to support his program according to their possibilities.

Virtually every planning issue has strategic and tactical elements, the one which takes an overview and relates it to other objectives, programs and activities, and the other which examines the detailed operations of actually achieving the objectives. These two terms offer useful structures for specifying the POINT OF VIEW which is being considered during any particular planning stage. And, the two terms serve to identify the details of decisions from the implication of those decisions, the local from the national, the concern of the nation from those of the continent, and the programs of regions from those of global significance.

Plans can be further characterized by the LEVEL for which they are being prepared:

1) The highest level of planning relates to overall LAND-USE. These decisions are derived from national policies and development plans such as those generally prepared for five-year periods. Within this context wildlands are allocated among alternative permanent wildland categories such as parks, forest reserves and wildlife sanctuaries, or for non-wildland uses such as agrarian reform settlement projects and agricultural development.

2) A second level considers the SYSTEMS PLAN for a network of national parks, forests or other category of wildlands. The systems plan analyzes the requirements for meeting national conservation objectives across the entire country.

3) A third level considers the CONCEPTUAL PLAN for each individual land unit within the systems plan. The conceptual planning level considers the objectives for each area, the alternative ways in which those objectives may be met, and the management and development to be given to the area.

4) At the fourth level, the individual MANAGEMENT PROGRAMS which were suggested in the conceptual plan are now elaborated into greater detail. Here planning deals directly with aspects of protection, administration, visitors, recreation, research and environmental monitoring, habitat maintenance and manipulation, resource harvesting and other related areas of action.

5) Finally, at the fifth level, the management programs are further elaborated into CONSTRUCTION, DESIGN AND DETAILED PLANS. At this final level, each facility, road, installation, training course, trail and sign are treated individually and in detail. Sketches, engineering drawings, itemized costs, lists of construction materials, manpower requirements, the content of training courses, and other aspects are now prepared to the level of detail necessary to establish specific PROJECTS. For example, specific projects may include: "build a macadam road for the section designated B to C in the development map;" "implement the ranger training course;" "build the visitor center;" "terminate the nature trail;" "initiate the research on habitat maintenance in savannah areas;" and, "establish educational cooperative activities with the local university."

Within each level of planning there are many INTENSITIES to which the plans may be elaborated. At any given level, a planning document may consist of two written pages and a map or diagram. In such an abbreviated from it is possible that all of the key questions can be discussed to the extent necessary. Alternatively, a plan may consist of several hundred pages, and be supplemented with maps, graphs, tables and figures. Planning documents may require a few days to a few years for their preparation. So long as the documents meet the needs of management, they are to be considered as legitimate plans. The depth or intensity to which the planner penetrates into the planning problem depends upon what he needs to know. A superficial plan is not a "bad plan"; too much information can discourage plan implementation and detract from the value of the original idea. While no absolute criteria can be given regarding optimum intensity for plans, the general guideline is that the depth of a plan is appropriate when the information and analysis which is provided is that necessary to support the communication, understanding and implementation of the particular decision.

The Basic Steps For Planning

Whatever the level or intensity of planning to be considered, there are a series of steps which are common to all decision-making.[1]

1) Select the objective.
2) Choose the alternative means.
3) Calculate and weigh the costs and benefits of each alternative means.
4) Choose the best alternative means.
5) Implement the chosen means.
6) Analyze the results.
7) Evaluate the results in terms of the objective.
8) Based upon the evaluation, replan the activity.

The OBJECTIVE (or goal) is stated in two general ways:

1) There are overall objectives which tie into the NATIONAL DEVELOPMENT PLAN: For example,
   a) enhance the quality of the human environment,
   b) provide long-term management for natural resources,
   c) protect genetic resources. These goals guide planners to align and focus their subject within the scope of the nation as a whole.
2) Specific objectives focus upon particular lines of work, and point towards activities which will contribute to the overall and specific objectives: For example,
   a) establish a conservation area in the vicinity of the capital city to provide for the protection of municipal water supplies and scenic context, provide outdoor recreation facilities for urban residents, and develop a

conservation center to promote ecological awareness as part of the recreation activities,

b) establish a national park, or other reserve, in each biological unit of the country,

c) inventory plant and animal species to identify centers of endemism and stocks of genetic materials with actual or potential importance to food, fiber and medicinal production.

Objectives must be clear and specific if they are to guide the manager along each step of the planning process. Actually, it is common practice to consider objectives and ways to accomplish them at the same time. Most wildland and park managers are more accustomed to analyzing how to do a job. Their experience lies in doing things. When they begin to plan, the problem lies in formulating objectives before discussing means. It is precisely this problem which can lead to the establishment of parks where a corn crop would be a more suitable landuse for conservation and development, and vice-versa, the to establishment of agrarian settlements where forest cover should remain permanently.

On considering alternative MEANS the manager contemplates different routes to the objective. He must consider when and where the work is to be done and who will do it. Some means will appear risky because they deal with factors beyond his experience. Some means look off into the future where the view becomes hazy. Other means will seem very secure because they are almost repetitious of past decisions, or they vary little from past experience. If the manager has good access to the literature and easy communication with fellow resource managers, he may find that the experience of others will help him plan. A "new idea" which originally appeared to him to be rather risky may be quite "safe" following consultation with colleagues.

Each alternative means carries a particular set of COSTS and BENEFITS. By adding up the costs of the ingredients of each alternative, and then adding the different benefits or OUTPUTS the manager can search for the true differences between the alternatives. Some will have similar benefits but carry different costs because they utilize more expensive materials or techniques. Others will be more costly than others because they carry higher RISK of failure, breakdown, or because they are based upon little practical experience. Still others will have similar costs but will produce different amounts or qualities of benefits. Logically, it is the difference which counts. Eventually, there will be one alternative which will appear to the manager to be the "best choice."

Some decisions on the optimum choice of means will be nicely quantified in dollars, units of recreation services, cubic meters of water, or numbers of jobs for rural employment. In most cases, however, the manager must be content with approaching an "efficient decision" by approximation. One means provides more benefits than the others for the same cost. Or, the means provides the same benefit as the others but at less cost. Usually, the most expensive and the least productive means can be quickly identified and put aside. Several means will appear similar, and finally, one will arise as outstanding.

The lack of fixed values for such items as recreation service, a maintained genetic resource, or a flowing stream is certainly uncomfortable to the wildland manager especially when planners in other sectors appear to always be dealing with nice crisp dollar values. Two considerations warrant mention: First, the values associated with wildland resources are in a rapid state of evolution (and perhaps revolution) and any pinpointing of their worth for a particular decision at a given time and place would probably not apply to another decision, time and place. And second, the values utilized by other sectors may or may not be any more valid than the qualitative values used in the wildlands sector, especially in developing countries. This will depend on the real formation of the relevant markets.[2]

The chosen means is then put into action. While in most current situations, means are executed for a given period of time (fiscal year) and then forgotten, the manager who wishes to learn from his experiment will implement each choice in the form of an EXPERIMENT. His intuitive decisions can be traded for systematic, step-by-step procedures which can lead to improvements in the performance of his park and department. The experimental design typical of forestry, agriculture, fisheries and social research is also applicable to park management.

The outcome of the chosen means must be compared to the outcomes of other past projects and activities. Such a comparison may relate to the past experience of the department or particular park, or relate to the experience of others through literature or from study tours. The more similar the implemented means to previous work, the more comparability will be found for the outcomes.

As part of the ANALYSIS the manager will wish to check the accuracy at which certain predictions were made. For example, did the number of rangers suffice to adequately protect the resources, or were there too few (or too many) rangers? Was the final cost of construction close to that which was expected? Was the time allowed for a research project sufficient? Did the vegetation cover a burned over area as quickly as expected? The manager will also wish to compare his outcomes with those of other sectors and departments to get an idea of his relative position in terms of production, construction rates, employment, visitors per day, research publications, etc.

The various factors considered in the analysis can then be put into perspective of the most important yard stick. Did the project give results which meet the original objective(s)? What are the implications of the under- or over-estimates for protection, research, construction costs, and employment?

The evaluation provides the basis for specific recommendations to guide future planning efforts to be more accurate. Particular suggestions will be made concerning the number of rangers, the budgeting of construction costs, the time required for ecological research

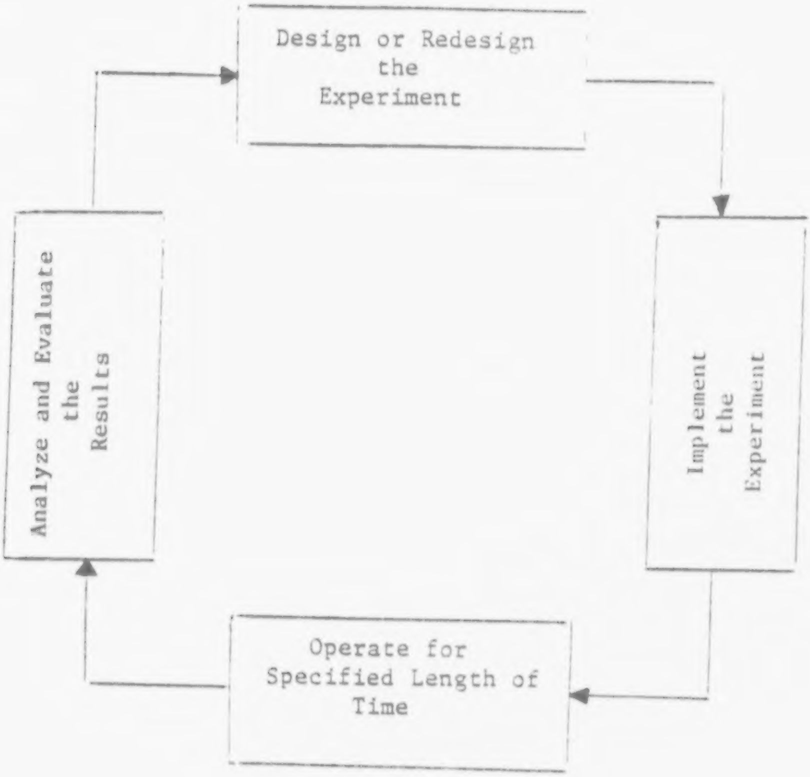

Design or Redesign the Experiment
Implement the Experiment
Operate for Specified Length of Time
Analyze and Evaluate the Results

Figure III-1. The fundamental approach to experimentation in forestry, agriculture, fisheries and social research can be applied to park management.

activities, and the rates at which various types of vegetation will cover different types of scars from construction, fire or avalanche.

These recommendations set the stage for the following fiscal year, or the next park planning mission. These recommendations provide votes of confidence (or discrepancy) for the approach, facts and figures utilized by the manager and his staff. As confidence rises, some types and amounts of risk will decline. The manager may then wish to be less conservative in his plans, take greater chances, try something new. The REPLANNING or FEEDBACK step in the decision-making process is basically a closing loop which carries the manager back to step one. However, different than the previous time he was there, he is now wiser because he has accumulated experience. As illustrated in Figure III-2(a) and (b), he can move round and round in a circle passing by zero every now and again or, he actually can move along a spiral or helix, never quite retracing his steps, and never returning back to the former zero. With each successive plan he becomes a better manager because he is now planning! (Similarly, he now becomes a better planner because he is now managing!)

Conditions Necessary for Planning

It was made clear in Chapter I that wildland resources in developing countries are in a peculiar planning situation relative to many other resources. If planning is to be done to propose particular wildland areas for permanent wildland status the decisions need to be taken as soon as possible. Wildland resources are generally unique, rare, fragile, and easily or quickly susceptible to irreversible loss. There is generally less information about the nature and function of wildland resources than other resources. There are alternative uses of the wildland resources for such purposes as agriculture, livestock grazing, lumbering, mining, fishing, and settlement, or in any event there are migrant agriculturalists who will attempt to work any and all lands.

But, how fast can park planning proceed? The very lack of information on the ecological and economic aspects of wildland resources tend to make the planning process seem utopian. The risk of making wrong decisions is rather high because of the many ecological and economic unknowns. Moreover, there are added risks from the dynamic nature of political aspects. Even with the planning process, many decisions on wildlands are based upon whimsical and personal criteria with little technical analysis in their defense. This is particularly dangerous where planning is done by individuals.

These and similar factors place the park manager in a dilemma. The ideal would be to prepare long-range comprehensive plans which deal with commitments for present and future generations and also which consider as many factors as possible. In the practical situation, the manager recognizes that his ecological and economic information is quite incomplete and the political directives are always changing.

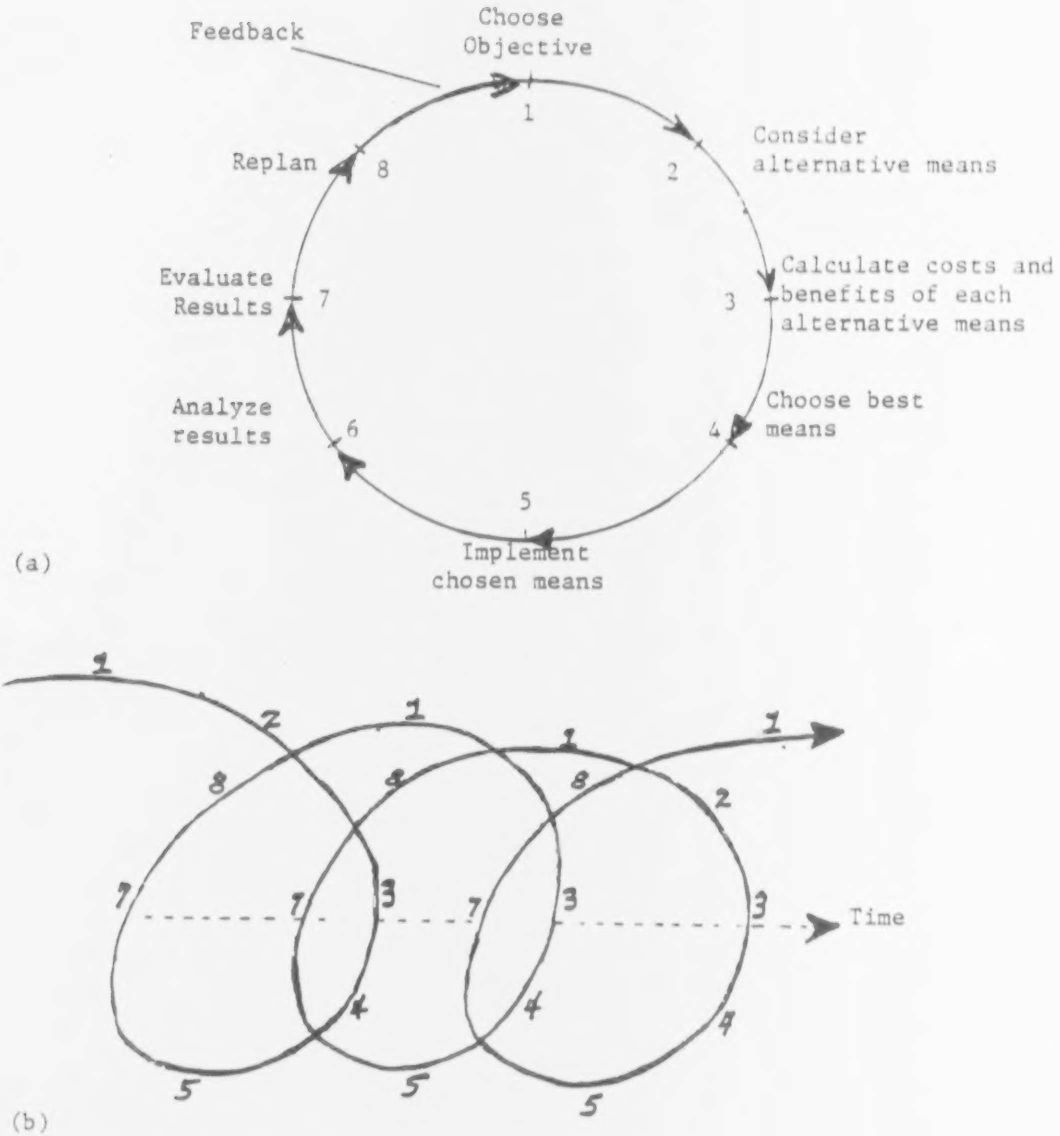


Figure III-2. The decision-making process which underlies planning can be viewed in a static sense (a) with 8 discrete steps, and (b) dynamically where the steps move over time.

With this type of context, is it possible to prepare plans that will be more than an exercise? Planning theory offers some guidelines.[3] Four pre-conditions for the use of the step-by-step approach to decision making are given:

1) Decisions must be made in SUCCESSIVE and INCREMENTAL steps which are significant but not so great as to carry excessive amounts of risks. Plans are SUCCESSIVE when they call for activities which are sufficiently similar to and follow the lines of previous work such that past experience serves to aid the manager in projecting, planning and implementing the new activities. Plans are INCREMENTAL when the new activities being planned are not only following the general lines of past experience, but move forward by steps (increments) which carry only the amount of risk which is acceptable.

For example, wildlands can be allocated either to permanent wildland categories (parks, forests, sanctuaries or other reserves), or to agriculture, intensive tree plantations, industry, settlements, etc. The change from unallocated wildland ("baldio") to national park is one which can be supported by experience. There is a minimal ecological and economic risk since none of the options for the various objectives would be closed. The clearing of wildland to establish pasture can also be done based upon past experience, but several options will irreversibly close. If the pasture and soils are allowed to deteriorate, further options will become lost, even irreversibly so.

Obviously, some wildlands are to be allocated to non-wildland uses to produce food and fiber. The guideline suggests that this can be done with minimal risks to conservation and development. Undoubtedly, there is urgent need to develop agriculture, livestock, timber and fisheries production, to employ people and provide opportunities for a respectable livelihood. But plans which rely on little past experience or very large steps forward carry considerable risks of failure. The bite comes in losing money, food, wood, meat, jobs and the natural resources which can be managed for these and other goods and services. The man-made resources which are lost in a bad investment can probably be rebuilt ecologically and economically. However, an excessively altered watershed can stop flooding and once again produce clean stable-flowing water, power and navigation only after considerable work and time. The extinct species are gone forever.

Very small steps may be safe, leading to predictable results and carry little risk. But, they may be too conservative and hold back the realization of national goals. Very large steps may lead to results totally unexpected and carry high risks. Small steps can lead to stagnation, huge steps to completely new lines of work. In one case the manager walks old familiar ground, in the other he jumps into the dark.

What, then, is the right size increment? That depends upon the judgement of the manager. For every amount of increase in speed to get to the goals, he must give up some security or certainty in the results of each plan. As he takes ever greater steps running down the mountain towards home, the chances of a bad fall increase. If he walks very carefully, he may never get there.

The successive-incremental step approach can also aid the manager in working his way back to safety after getting off the track. If the plan leads to results which are unacceptable, the manager can prepare a plan which aligns more with previous experience or shortens the step forward (or both). If he starts to stumble on the run down the mountain he can slow down or shorten his pace to that which still provides him some reasonable speed but with greater security of getting to the bottom in one piece.

2) Information must flow freely throughout the organization as well as between it and other institutions and specialists within the country and elsewhere. The manager must be able to receive feedback concerning the activities being implemented within the park and department. This feedback can come from his own staff, the general public and other government or private institutions. He and his staff must be able to read literature and have contact with colleagues from other departments, professions and nations.

In concept, the feedback loop of the planning model cannot close the planning process and replanning cannot take place without the proper flow of information. In practice, this means that everyone from park laborer and ranger to manager and director must participate in open dialogue, constructive criticism, evaluation of activities and the formulation of recommendations for new programs and projects. It means that the personnel are encouraged to read literature and converse openly with visitors (general public and professional colleagues). Study tours and professional meetings can promote exchange with other parks, departments and nations. The parks can welcome touring professionals and students to support such exchange.

The entire vertical line of staff must participate in the dialogue. Department directors require the up-to-date experience of the field staff. The latter need to understand the circumstances and criteria for planning decisions if they are to support the director with valid and logical comment. This also suggests that all personnel must be provided with the opportunity to inspect work activities, to travel and to associate with others at the same and other levels on the management hierarchy.

3) The park department must be responsive to the wishes, ideas and concepts of the national political process, the society and of science. This means that the director and all personnel must have their ears open. They must read newspapers and be aware of philosophies and trends in the nation as they relate to wildlands. Pressures from interest groups need not sway the department to make compromising decisions, but the department must recognize the pressures when they come and understand quickly their significance. This does not mean that the park personnel all become politicians as opposed to technicians. It means that they must work as part of the policy-making system and avoid isolating themselves from national development. It also means that copies of the national development plans and policies be available to all personnel.

4) Finally, the park department must be representative. The department must include and involve individuals which come from the many regions, sub-cultures, and strata of society. On the contrary, a department which is not representative cannot be expected to make decisions for managing society's environment and natural and cultural wealth in ways consistent with the majority of the people's wishes. Similarly, a non-representative department is likely to interpret the national development plan and policies in a peculiar fashion. A lack of representativeness in the related professions also runs the risk of excluding important scientific, technical, economic or engineering opinion.

These four guidelines are not easily put into action overnight. Tradition is a major obstacle. There is a rush to move ahead and not waste time reviewing the past. One level of hierarchy does not dialogue with another. And, managers are usually required to have university degrees in specified fields. Such concepts make for very real difficulties in the development of park management capacity. However, the experience to be presented in subsequent chapters suggests that in reality, planning is being done in many countries of Latin America.

Transforming General Conservation Objectives Into Practical Directives For Action

In Chapter I, the conservation objectives for wildland management were presented. From those, the specific objectives for the national park category were singled out for review in Chapter II. For these park objectives to be useful to managers and planners in selecting, designing, managing and developing national parks, these general statements must be transformed into practical guidelines upon which some specific action can be taken.

Each of the ten objectives suggested for national parks will now be examined to deduce specific strategic and tactical directives:

Objective 1: Maintain representative samples of major biological units as functioning ecosystems in perpetuity.

The strategy for each nation is to select at least one area in each of the major biological units to be found within that nation's territory. The sample area must be representative of the biological unit in terms of vegetation, fauna, topography and soils. It must be of sufficient size and the necessary shape to comprise an ecosystem which is capable of self-sustained continuity on a perpetual basis. Exceptions may occur where neighboring small nations may choose to establish a regional network of areas to avoid costly repetitions of areas within particular biological units.

Before selecting representative areas, a system of biological classification is required which will serve for the common use of both scientists and wildland managers. Based upon the recommendations of the IUCN and the Ecosystems Conservation Group (made up of FAO, UNESCO, UNEP and IUCN) it is suggested that the classification systems proposed by Dasmann[4] and Udvardy[5] be utilized for identifying the major biological units in each nation. As discussed in Chapter II, the Holdridge Life Zone System can be employed simultaneously to the Dasmann and Udvardy models, especially where topographic or climatic change over relatively short distances give rise to significant ecological differences. As Dasmann has expressed, it is now up to the local experts in each country to provide further definition and detail of the classification system if it is to be become a "truly international system, useful for the purposes of conservation.[6]

A second framework for assisting in the identification of areas would be the preparation of a geomorphological classification. Such a system would identify volcanic, sedimentary and metamorphic rock, former lake bottom, uplifts, faults and other features which provide criteria for denominating major types in addition to those derived from biological criteria. As will be noted from the experience of Chile to be presented in Chapter VI, a map of biological types was superimposed over a map of geomorphological types to identify major classification units within which national park sites were subsequently identified.

Tactically, this first objective provides the basis for three guidelines on the planning of wildlands destined to be managed as national parks:

1) *The area must include a representative sample of a biological unit (biological province or biogeographical province*. After preparing a map for the biological classification of the nation, an area is chosen within each unit which is typical of the unit's topography, vegetation, fauna and soils. The area covers the variation typical of the unit. Unique or rare features may be included, but emphasis must be placed on *representative* characteristics.

2) *The area must comprise one or more ecosystems capable of sustained survival and auto-regulation*. The area will have sufficient *size* to contain the habitat requirements for the flora and fauna and for the community structure. The area will have a round *shape* to the extent possible, avoiding irregular spurs and jagged edges along the exterior boundary. If two or more parks are established in the same biological unit, each park must be as large and near-round as possible. Where feasible, corridors will connect the separate parks.

3) *The area must be managed in such manner as to guarantee that it remains perpetually in a natural state*. All activities to be considered will be judged in terms of their possible effects upon the natural cycles, plant and animal materials, and the long-run natural state of the area. This guideline sets the overriding rule for measuring all questions and possible solutions for park development.

Objective 2: Maintain Ecological Diversity and Environmental Regulation

Generally, species diversity increases inversely with latitude. That is, more species per hectare are to be found in the Caribbean basin or tropical forest of the Amazon than in the temperate areas of Patagonia. Conversely, the genetic diversity within species increases directly with latitude, giving greater genetic diversity in areas of lesser speciation. In pragmatic terms this has several implications for park planning. Between neighboring biological units (biomes, biological provinces or life zones) there are transition zones or ECOTONES. At this interface, where for example terrestrial biomes meet oceanic biomes or forest meets savannah, an increase in variety and density of species is to be expected. This sometimes obvious, sometimes subtle strip of land and water is comparable to the crack between the two tables. The crack will be large or small, depending upon the characteristics of the two tables.

Strategically, each representative sample of a major biological formation must include the maximum possible variety and diversity found around the edges of that formation, and the typical or unique internal features of the area.

Tactically, this objective has major implications for the selection and management of conservation areas:

4) The conservation area must include samples of the major ecotones between each biome, biological province or life zone. The boundary of each area should be at such distance into the adjoining biomes, provinces or life zones as to include these ecotonal strips within the conservation areas. As shown in Figure III-3, parks should avoid locating boundaries along ecotones.

5) Management must avoid activities and developments in and along ecotones. Activity centers (camps, picnic sites, staff housing) must be located away from ecotones. Roads and trails should be planned across ecotones at perpendicular angles as shown in Figure III-4.

6) The conservation area must include a variety of the features, sites and phenomena required for self-regulation of the area. The STABILITY and RESILIENCE of the conservation area depends in part upon the diversity of species, genetics and other natural features and phenomena, such as nutrient cycles and hydrological cycles. Figure III-5 demonstrates the significance of this guideline on planning. Specific sites must be included where related to food chains. The normal flow of surface and ground water must be assured. The dynamic properties of sand dunes, shore lines, wetlands and drainage systems must be examined and the linkages included in the park. Alternatively, the critical linkages can be appropriately managed through cooperative activities with forest reserves, wildlife sanctuaries or other wildland categories.

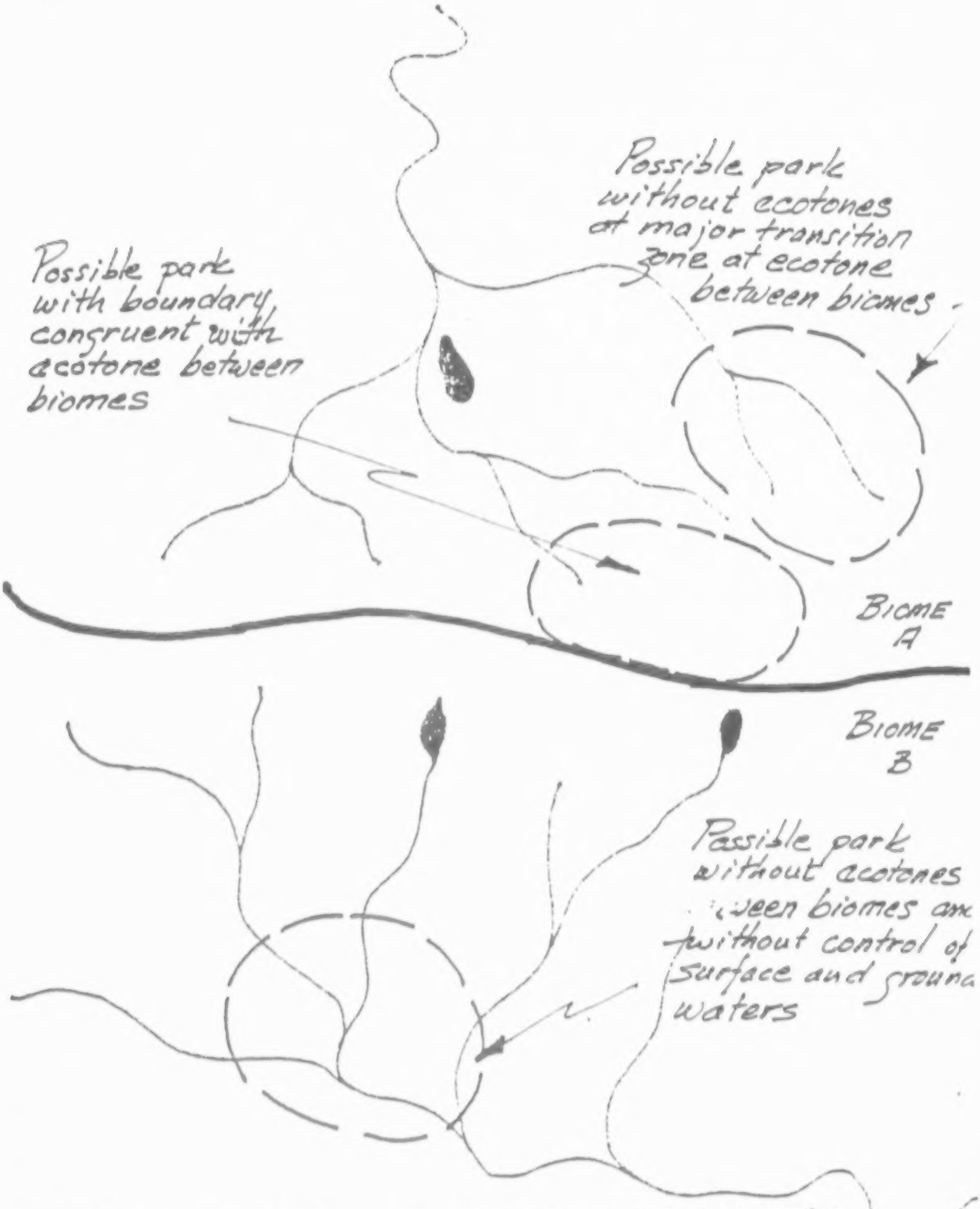


Figure III-3. Conservation areas should be located to include samples of the biologically rich ecotones along transitions between biomes, provinces or life zones. Typically, however, conservation areas are located away from the key transition zones or with a boundary which is congruent the actual ecotone edge as shown hypothetically above. Even less biologically valuable are those conservation areas which neither contain a sample of ecotonal resources nor the upstream catchment, as shown below.

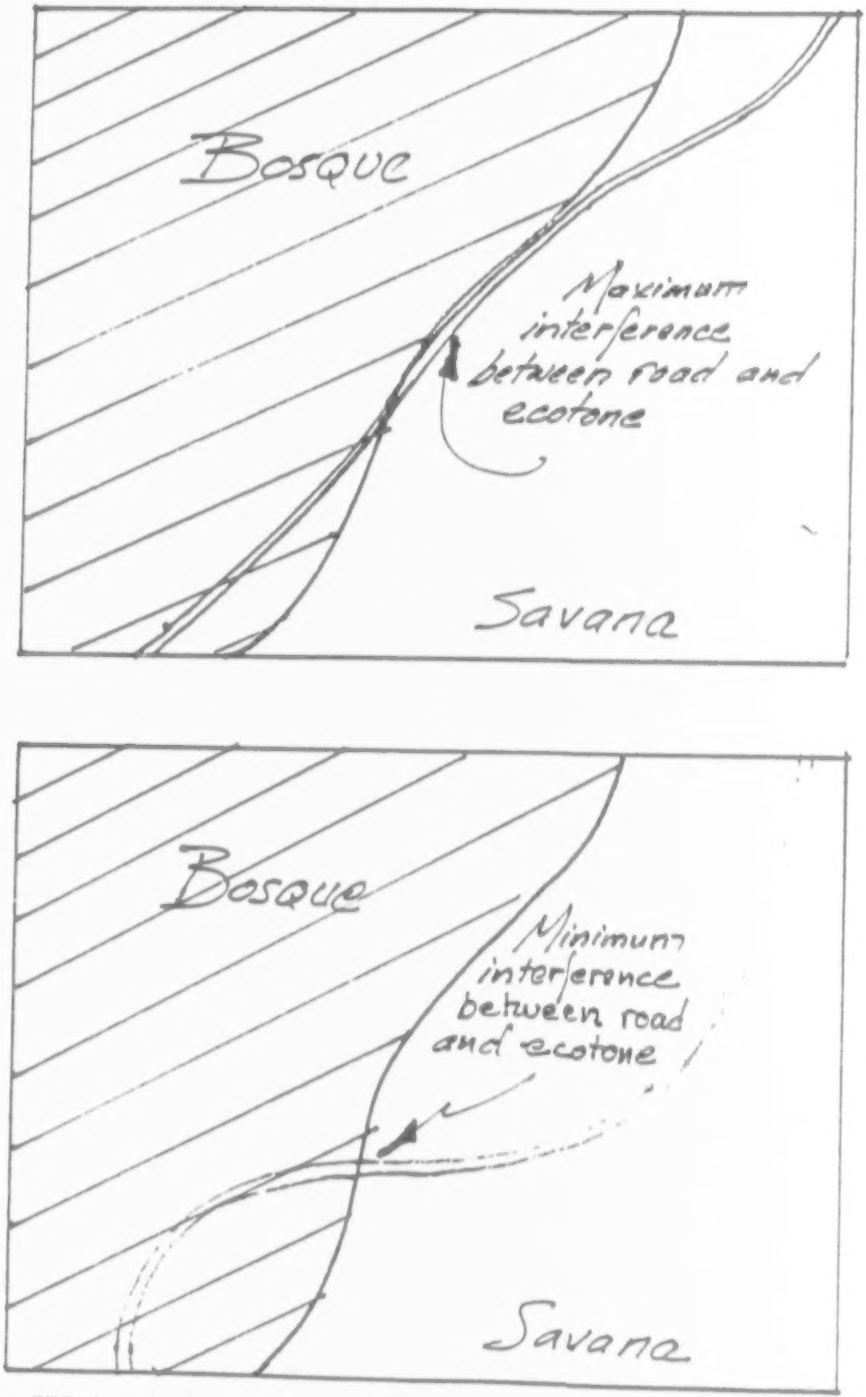

Bosque
Maximum interference between road and ecotone
Savana
Bosque
Minimum interference between road and ecotone
Savana

Figure III-4. Activities and developments must be avoided along ecological transition zones. In the first case, above, a road cuts parallel from savannah into forest, causing maximum interference with the ecotone. In the second case, below, the road is designed to enter the forest from the savannah at right angles to reduce to a minimum the interference the road causes upon the ecotone.

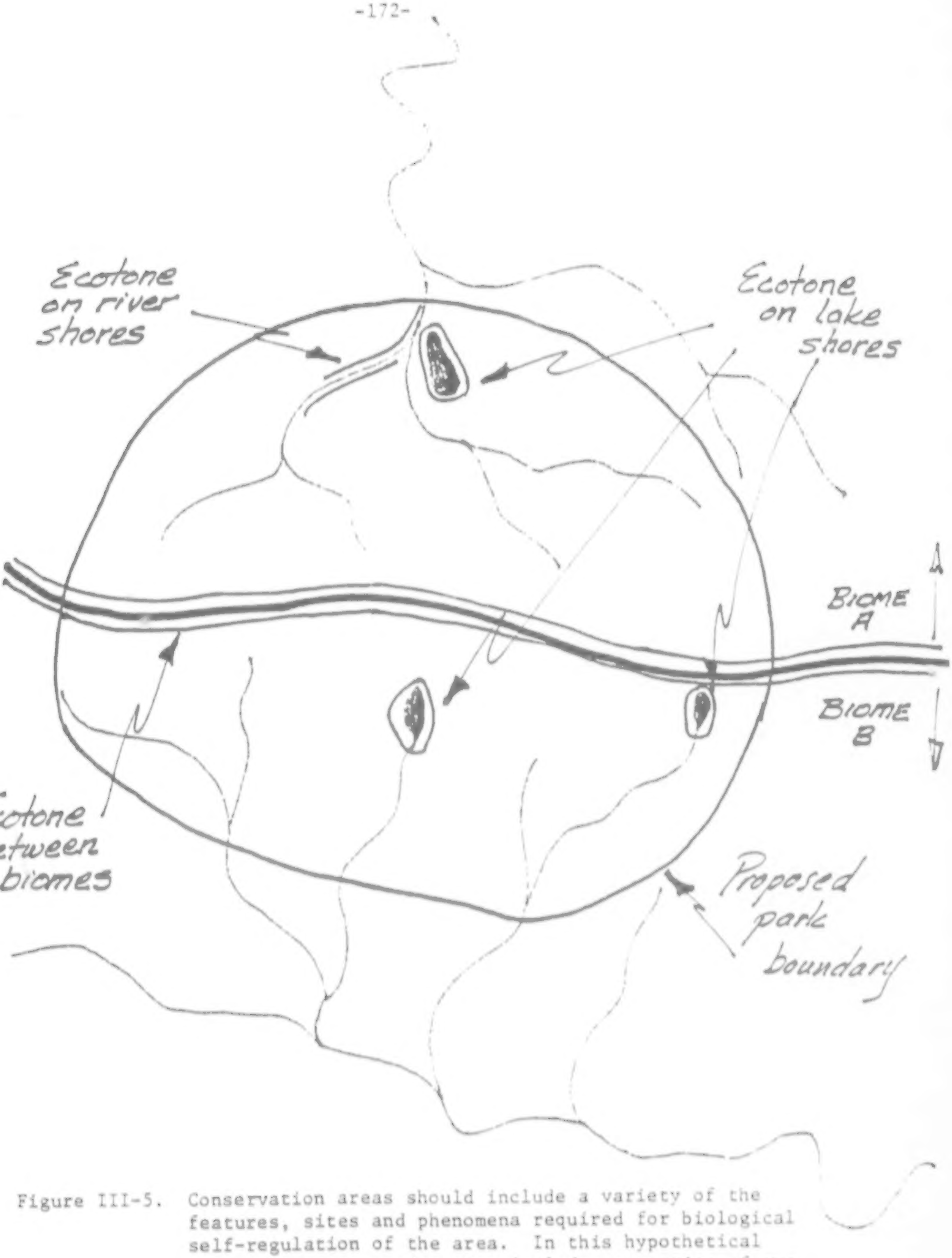


Figure III-5. Conservation areas should include a variety of the features, sites and phenomena required for biological self-regulation of the area. In this hypothetical case, the conservation area includes a portion of two biomes, upstream catchments in both, and the rich ecotonal lands along lakes and rivers.

7) Management must avoid activities and developments which interfere with features and phenomena upon which self-regulating mechanisms depend. Manipulations and construction projects, such as roads, bridges, trails, buildings, draining of wet areas, cutting of groundwater flows, removal of old-growth trees, all potentially interfere with mechanisms upon which park self-regulation depends.

Objective 3: Maintain Genetic Resources

Genetic materials are the elements of the ecosystem which bear the messages of life. Genetics carry the correspondence of evolution, they signal the forces of reproduction such that a male and female tapir can produce a young tapir which looks very much like themselves and which carries virtually the same baggage of instinct and behavioral traits. In a natural environment there is variability, there is natural extinction and speciation. Once a gene has been altered, it gives a different message. If the gene is eliminated, there is no message at all. If the genetic variability is reduced, the reservoir from which the most suitable message can be selected will be limited. Ultimately, the reservoir may be drained, and the few messages which remain may not contain among them a suitable code of life which can stand up to the situation. The capacity to evolve with evolution will have been reduced beyond some minimum threshold.

The strategy is to maintain areas capable of functioning as reservoirs for the genetic wealth of the nation in dynamic evolution.

Tactically, this is a monumental task and transcends the scope of national parks. However, much can be contributed by the careful management of natural areas. In most countries, the national parks are the only areas which somewhat systematically function as protected genetic pools.

8) Sites of ENDEMISM must be included within conservation areas. Particular valleys, mountain tops or shorelines which are centers of endemism or the sites of habitat requirements for endemic, rare or unique species, should be included within the boundary of the conservation area. Furthermore, such sites should be sufficiently within the park, away from boundaries, to avoid adverse external influence.

9) Management should avoid activities and developments which may affect sites of endemism or critical habitat requirements of rare or endangered species. Generally this relates to roads, trails and buildings but can also guide the location of recreation areas and even extensive human activities, such as fishing in páramo (tropical "alpine meadows") or other ecologically fragile areas.

10) Conservation areas must be located according to the RANGE of individual species. The range of individual species of plants and animals will extend vertically across different altitudes and horizontally across the countryside covering greater or lesser distances. Among the parks in a nation's network of conservation areas,

20several can include representative samples of different portions of the range of chosen species.

Objective 4: Maintain Sites and Objects of Cultural Heritage

In most wildland areas of Latin America, remnants of objects and structures of pre-historical and historical value can be found which are significant for management as part of the nation's cultural heritage. Burial grounds, pyramids, fortresses, and famous sites and routes of historical turning points in human evolution are intimately and inextricably related to nature.

The strategy is to protect, stabilize and restore objects, structures and sites of significance to the nation's cultural heritage, and provide for their study and appreciation by science and the public.

Tactically, the national park is one of several approaches to wildland management which provide a mechanism for the protection, study and appreciation of cultural resources:

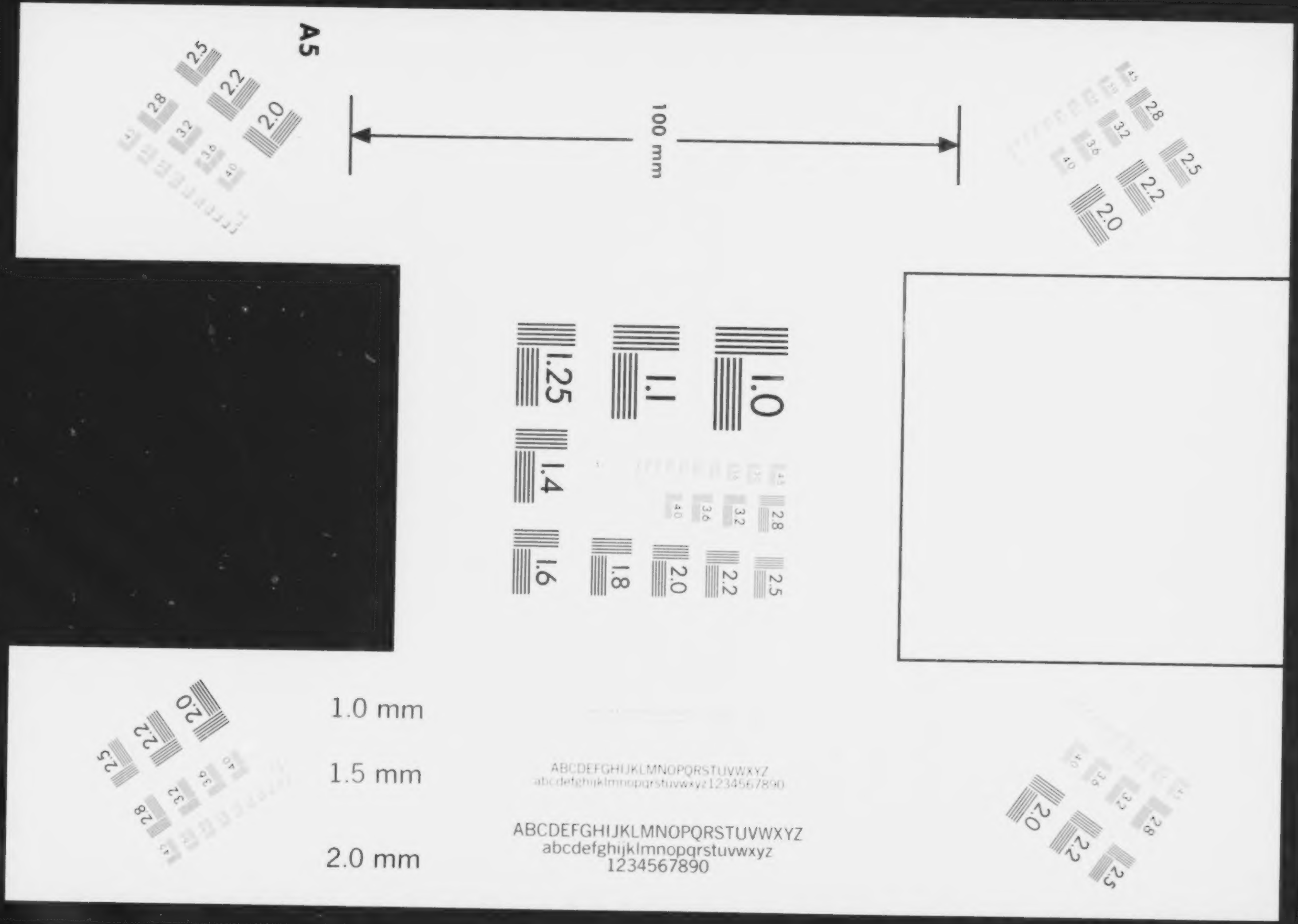
11) Where cultural objects, structures or sites lie within natural areas, they are to be afforded appropriate protection and stabilization. The cultural resources receive the same protective status as the natural. Where deterioration is present (natural weathering, man-induced destruction, pillaging), measures are to be taken to at least halt deterioration.

12) Furthermore, where cultural resources lie near to natural areas, they may be incorporated to provide adequate protection and an appropriate natural setting. Small or large objects, structures or sites may lie nearby a conservation area which has been selected by the aforementioned guidelines. For reasons of aesthetic setting, quality of management and presentation, and efficiency in the use of field staff and institutional capacity, it may be appropriate to extend the boundary to incorporate the cultural resource as exemplified in Figure III-6.

13) Cultural resources are incorporated into the management of the wildland area to provide an aesthetic and consistent setting required for study and public visitation. The culture resources are set into the natural setting to ensure the necessary space and access for research and interpretation.

Objective 5: Protect Scenic Beauty

Many natural resources are considered to be significant because of their aesthetic qualities. Mountains, canyons, forests, water bodies and the like are valued differently and subjectively by different cultures. Such values are generally expressed in relative terms of the spectacular, the inspiring, the superlative.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The strategy is to identify and place under management those sites, features or areas which are significant for their scenic beauty.

Tactically, the area defined for management as a national park must possess scenic qualities:

14) A national park must include sites, features or areas which possess spectacular, inspirational and superlative aesthetic or scenic value. The scenic beauty of a forest, mountain, canyon, desert or seacoast must fall in combination with resources of relevance to the other objectives if the total resource is to warrant national park status. It is very useful to develop a landscape classification system for the country to guide the selection of scenic areas parallel to the previously mentioned biological and geomorphological classification systems.

15) Where superlative scenic sites and features lie near to a conservation area, they may be incorporated to provide them adequate protection. Some outstanding features or sites can be logically annexed to a nearby national park. Green areas along highways, around cities and interposed with agricultural landscapes require other forms of management described in Chapter I.

Objective 6: Facilitate Education, Research and Environmental Monitoring in Natural Areas

The management of each conservation area depends upon an expanding base of knowledge about the resources and their use. Management also requires a constant assessment of its activities to ensure that its work is appropriate. These research and monitoring activities can also support the development of adjacent lands for agriculture, forestry and fisheries. Furthermore, the process and mechanism of research monitoring can provide the basis for training and educating scientists and technicians. The knowledge can be utilized to interpret the natural and cultural resources for the visiting public and to design and disseminate understanding and appreciation of natural and cultural values. Naturally, all such activities are located and operated within the limitations suggested in tactical guidelines 3, 5, 7 and 9 above, under Objectives 1 - 3.

Strategically, the objective is for each conservation area to support the study of its particular natural and cultural resources, the transfer of knowledge to other rural development and environmental conservation activities, and the education and training of teachers, scientists and the general public.

Several tactical guidelines can be derived from this strategy:

16) Research activities designed to study and understand the natural and cultural resources of the area will be supported by access, facilities and services. The research will be relatively non-manipulative under the constraints of Objectives 1 - 3. Depending upon location and accessibility, it may be advisable to provide housing

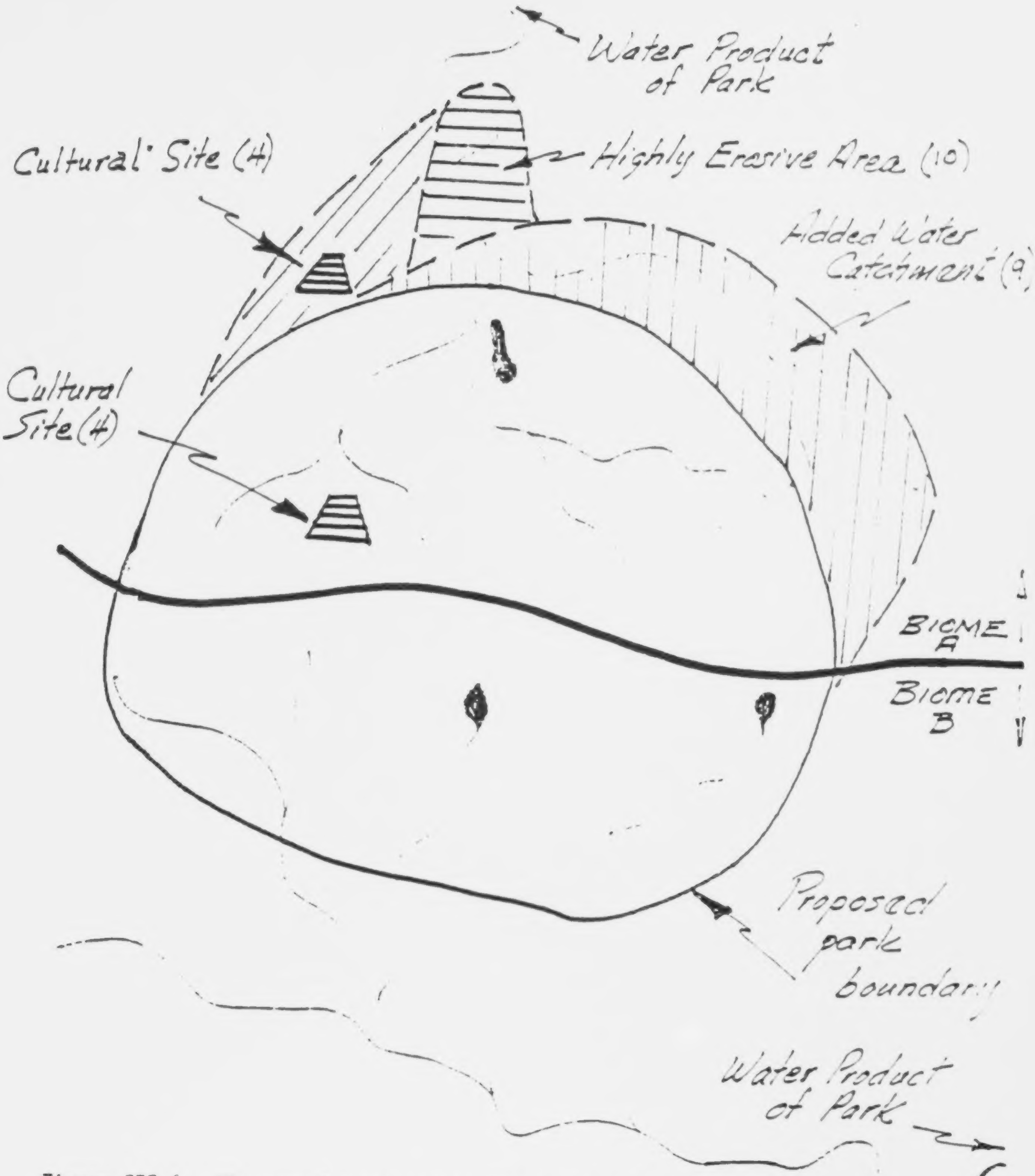


Figure III-6. The same hypothetical conservation area presented in Figure III-5 can be planned to include an outlying cultural site (objective 4), a nearby upstream catchment (objective 9), and a highly erosive area (objective 10).

and laboratory facilities and transport services. The park will serve, therefore, as a center for considerable activity. Meetings, field trips, consultations and outdoor laboratories will be among the normal uses of the park. Facilities and services must be designed to support these activities. Systems and physical facilities for the filing and storage of information and collections, for projection and reproduction of photographic materials, meeting rooms, an auditorium, and the like may be required according to the particular case. It is expected that relations will be established and maintained between park staff and scientific groups, universities, the extension services and planning bodies.

17) Special sectors and zones of the conservation area should be designated to provide exclusive long-term use for scientific inquiry. Particular forms of instrumentation will be required on some sites to measure and record natural phenomena (stream calibration, solar energy, weather, seismic activity, etc.). Such monitoring activities will generally require long-term exclusive use of particular sites which are as free as possible from external influences.

18) Research and monitoring activities will be designed such that:

a) the information will provide park management with frequent assessment of all management issues and programs, including protection, boundary location, effects of visitation, stream flow, maintenance of installations, etc.;

b) the information will support the overall rural development effort in agriculture, livestock, forestry and fisheries, as well as the various activities related to environmental conservation including watershed management, pest control, plant and animal health and sanitation, and land-use planning;

c) the information (and mechanism of research monitoring) will support the training and education of scientists, students, planners and engineers, as well as the general visitors to the park, to facilitate the preparation of the nation's scientists and technicians and the general appreciation of the natural and cultural values contained in the park; and

d) the information will support the preparation of educational materials for use in schools, technical training centers and universities as well as in the public media (radio, television, films, slide shows, portable exhibits, press, etc.) and extension services (agriculture, livestock, forestry, fisheries).

19) Particular facilities, activities and sites will be designed and managed for the reception, guidance, education and training of organized groups and the general public on the resources of the park. Activities for groups of students, visiting scientists or specialists, civic or young people groups and the general visitor will be established. Each group may require a particular activity, but the required facilities may be common to all. While group activities may be

infrequent and sporadic, the flow of general visitors may be constant or seasonal. Additional facilities will often be required to attend groups and general visitors such as entrance stations or reception centers, museums or exhibit rooms, meeting rooms, interpretative trails which are self-guiding, sign systems, on-site exhibits, and overlooks and viewpoints. Guide books, pamphlets and maps may be required. And, the park staff will often need to direct, guide and inform groups and visitors.

Objective 7: Facilitate Public Recreation and Tourism

Since the creation of the first national park in 1872, there has been a commitment of national parks to "preserve for present and future generations... as a pleasuring ground for the use and enjoyment of the people." It is this objective which clearly separates the national park concept from other management categories, such as biological reserves, which are managed primarily for research. However as discussed in Chapter I, the interpretation of "use and enjoyment of the people" is taken here in a broad way to include many activities which do not always involve the direct physical presence of the individual on the park site. To the extent that the individual receives domestic water or water power, new knowledge, new foods and medicines, and social and economic development because of the management of national parks, then he is also using and enjoying benefits of the park.

Recreation and tourism are generally treated as synonymous, a practice which, as discussed in Chapter II, leads to confusion of concept and management. In concept, RECREATION is the process by which people utilize leisure time to explore and develop personal interests especially related to physical, spiritual and inspirational goals. While sports are typified by their order and compulsion, recreation in national parks emphasizes relatively non-ordered non-compulsive exploration of humans and nature.[7] The encounters may be passive such as the viewing of wildlife or inspiring natural beauty, or on the other extreme, very active such as mountaineering or cave exploring. Recreation in the national parks of Latin America, as in other nations of the world, is generally associated with walking, hiking, camping, driving, viewing and picnicking.

TOURISM, as distinct from recreation, is the mechanism by which people move from their homes to the sites of destination and return. It involves travel, lodging and food services along with the necessary support facilities to get organized, make purchases and obtain information. The role of recreation and tourism in national parks was examined in Chapter II. Both activities are dependent upon the capacity and nature of the resources of the park. Certain recreation activities take place inside the park. Ideally, the major facilities for tourism, however, are located outside of the park. (Exceptions are acceptable where parks are extremely remote.) The clear separation between recreation activities and tourism facilities is important to avoid the inherent inconsistencies between intensive development and ecosystem conservation, and to assist orderly rural development. These activities are limited in accordance with the previously stated guidelines under Objectives 1 - 3.

Strategically, the object is to provide opportunities for resident and international visitors to explore, enjoy and understand the natural and cultural heritage. It is assumed that other public and private programs will provide opportunities for the play and sport requirements of the people elsewhere outside of the park. And, where international visitation to national parks is encouraged by motives of international understanding, cooperative international research or as a means to earn foreign exchange, national parks can play a role in attracting international visitors and providing them with appropriate services.

Tactically, several guidelines can be derived for planning purposes:

20) Sectors of the park will be managed and developed to provide for a spectrum of recreation activities. The spectrum will run from activities typified by relatively intensive human density (picnicking, reception facilities) to the extensive activities (hiking, mountaineering). The necessary facilities and services will be provided (sanitation, probable water, camping and picnicking sites, parking, first aid and emergency, orientation).

21) The section managed for recreation will be located and developed to minimize conflicts with other park uses. The sectors managed for recreation will be separate from those dedicated to research and environmental monitoring.

22) Where tourism is an important activity, in conjunction with national development goals, the management and development of major facilities and services will be treated outside of the park boundary, except where remoteness or particular circumstances dictate otherwise. Particular isolation or opportunities for intimate contact with nature may warrant the development of hotels and related facilities in the parks. However, as a generalization, the park manager should assist regional planners and hotel developers to select and design facilities in nearby towns or in sectors outside but adjacent to the park.

23) Where the park is to be utilized for local recreation and international tourism, and where this involves two or more different cultural groups with largely different life styles, care must be taken to appropriately integrate the facilities, services and activities of the two user groups. The "demonstration effect" of foreign tourist, the vast difference between hotel and local housing, etc., may create negative feelings. The manager will have to consider alternative designs and locations of activities to minimize conflicts and maximize reciprocity of positive human experiences between local and foreign visitors.

Objective 8: Support Rural Development and the Rational Use of Wildlands

Most nations of Latin America have RURAL DEVELOPMENT as an explicit goal of national development policies and plans. These policies and plans consider means to mobilize agricultural, livestock, timber and fisheries resources to provide employment for existing rural residents and resettlement schemes. They also treat specific improvements in transportation, communication, health, education, marketing and social and political justice.

And, in most rural areas there are territories which for ecological or economic reasons are MARGINAL to conventional agriculture, livestock and timber production. Generally, current technological practices are too expensive to apply given the expected yields. Some of these areas are ECOLOGICALLY MARGINAL due to their natural conditions, such as low nutrient availability in the soils, or sparse or excessive rainfall. Other areas are ECONOMICALLY MARGINAL due to their distance from markets, low returns to capital, technological inputs or labor.

The popular concept of "marginal" lands parts from the premise that territories which have so-called poor sites, bad drainage, flooding, too many species of hardwoods per ha or too steep topography are "useless." Thus, rainforests, semi-arid lands, deserts, mountain lands and wetlands are generally left out of land classification and evaluation projects and are left to migratory agriculture, uncontrolled logging, hunting or grazing. Deforestation, desertification, dunification, local species extinction and stream erosion follow.

From the viewpoint of ecodevelopment, the role of these lands in watershed regulation, species maintenance, and soil-nutrient relations cannot be forgotten. However, conventional attitudes towards marginal lands lead to their neglect and hence, to their physical destruction. They become a LIABILITY to eeodevelopment because their deterioration often extends to other more productive lands through flooding, sedimentation, and the like. The costs for the reclamation of these sites and their areas of influence will be charged against other sectors, and perhaps other generations.

The strategic implications are twofold: National parks are to be planned and managed to support the conservation and development of rural lands. And, to the extent possible, national parks are to incorporate marginal lands.

Several specific tactical guidelines can be suggested:

24) National parks are to be planned and managed in coordination with institutions responsible for the design, construction and maintenance of transportation and communication installations. Many roads, sources of power, telephone connections and mail services are of mutual interest and can be planned on a coordinated basis. The park managers are to defend with technical arguments those areas which must remain roadless, free of communications towers and the like. But also,

by participating in the regional planning exercise, the park manager will become sensitive to the requirements of other sectors.

25) National parks should be planned to adequately manage and protect sites which are of critical ecological or economic importance to the rural region. Such CRITICAL AREAS as avalanche-prone slopes, erosive soils, upstream catchments, sources of breeding stocks or traditional seeds or materials, and migratory bird nesting sites, can be incorporated under the umbrella of park management or supported by "extension" efforts of the park manager to other institutions.

26) Whenever possible, national parks should be planned to provide employment opportunities including supplementary work to part-time employees of other neighboring activities, and seasonal work opportunities to students and school teachers. The basic personnel of the park must be on a full-time schedule to provide the park with continuous management. These employees will in turn form part of the nucleus of local citizens capable of making year-around contributions to the community. Many neighboring activities in agriculture, forestry and livestock production and related industries are on a seasonal or part-time basis. Parks can generally provide seasonal or part-time jobs for neighbors in construction, maintenance, guide and visitor services. Such jobs can supplement other activities and support rural stability. Teachers and students can often be employed during summer seasons to work in park activities related to biology, education, training and visitor services. In addition, the flow of visitors is often sufficient to support local art and craft activities, thereby serving to create employment and to maintain local cultural values.

27) Educational and training services should be provided in national parks to support the intellectual and practical development of rural peoples. In conjunction with the interpretative and educational activities on natural and cultural resources already mentioned under Objective 4, interpretative exhibits and trails can be designed specifically to meet the needs of local rural people. Specific programs and publications can be offered to educate and inform local citizens concerning the function and value of natural and cultural resources, their care and maintenance. Training courses on practical nature conservation, cultural history, wilderness survival, etc., can be offered to local youth groups.

28) Recreation services in national parks should be particularly designed to meet needs of local rural peoples. As part of the recreation program of the park, particular facilities and services should be provided for healthful outdoor activities which fit within the physical, sociological and cultural requirements of the local citizens.

29) Marginal lands, wherever possible, should be incorporated into national parks to ensure their stable utilization. Mountains, valleys, river shores, coastal lands, forests, swamps and deserts can be combined with resources capable of meeting other park objectives. Lands which are conventionally considered to be "useless" can be integrated into conservation land uses of importance for ecodevelopment. In this way, so-called marginal lands attain value as scenery, genetic resources, or

25as elements of food chains and energy cycles. Their maintenance within parks at least ensures against destruction, lost options and accruing reclamation costs. The worthless is converted into a resource for conservation and development at a relatively low cost.

30) The research, education and monitoring activities of national parks should contribute to the development of solutions for the wise use of marginal lands in the region within which the park is representative. By using the marginal lands near the park, new non-conventional uses of these lands can be designed and tested. Such uses will include wild fauna and flora production, tourism, multiple-cropping agro-forestry, etc. The education and training programs of the park can interpret these opportunities and help to inform institutions and the public of their application and significance.

Objective 9: Conserve Water Production

A general objective ideally applied to all land-use throughout the nation is the conservation of watersheds and water production. This is particularly so since virtually all nations of the region face major reductions in fresh water supply. The management required to meet the previously stated objectives of national parks will provide a mechanism for conserving the production of water. The maintenance of ecosystems in a natural state, the maintenance of environmental regulation and the research and monitoring functions provide the basis for supporting this overall national conservation objective. It must be recognized, however, that while the national parks can support this effort, it would be inconsistent to carry out major engineering works in the parks such as reservoirs, dams and dikes. Similarly, deforestation and reforestation, and the introduction of non-native plant or animal species would alter, perhaps irreversibly, the capacity of the resource to meet the previously stated objectives.

Strategically, national park management is to conserve water production.

Tactically, it means that part of the stewardship responsibilities of park planning and management is to ensure that water resources of the park are well maintained. This happens virtually as a by-product of the activities already implemented to meet previous objectives. Pursuit of this objective, however, does affect park planning and management in three direct ways:

31) Wherever possible, watershed catchments should be included within park boundaries. While some catchments will have been included already by the analysis of previous objectives, other sites nearby may be annexed to the park to receive protection at little added cost.

32) The research and monitoring activities of the park should place particular emphasis upon study and understanding of water resources.

33) The education, training and interpretation programs should present this information and understanding in support of ecodevelopment in the rural area and throughout the nation.

Objective 10: Control Erosion and Sediment, and Protect Downstream Investments

Another objective ideally applied to all land-use throughout the nation is the control and minimization of erosion and sediment to avoid the loss of natural resources and capital developments. Similar to the water production objective, the pursuit of all above objectives provide a mechanism for the control of erosion and sediment which may have negative impacts on downstream resources and investments such as fisheries, reservoirs, hydroelectric turbines, irrigation works, roads, towns and recreation beaches. Also similar to Objective 9, the national park cannot be managed specifically to control erosion and sediment if habitat manipulation such as reforestation or engineering works are required. Such intensive impact would counteract the first three objectives related to the conservation of areas in their natural state.

Strategically, this final objective means that the management of the national park should be planned to control erosion and sediment to the extent possible, and relate to the security of downstream peoples, their installed capital and investment programs.

Tactically, it means that the national park, by virtue of the pursuit of the previous objectives, will minimize erosion and provide a relatively stable upstream-downstream relationship. But, three guidelines make this objective more than an automatic by-product to park management:

34) Where erosion exists due to land use practices from the period prior to park establishment, appropriate means of stabilization should be applied. Generally, engineering works are included only where all less-intensive methods of reclamation have failed. Exotic species are strictly excluded.

35) Where highly erosive areas lie near the park, and other wildland categories cannot manage the problem, these areas should be annexed to the park for appropriate management. The lands can be reclaimed by natural or man-assisted means, and reverted to semi-wild state. Agriculture, grazing or timber extraction will be automatically prohibited.

36) And finally, all physical development and activities are to be designed, implemented and maintained to minimize erosion and sedimentation. Thus, all bridges, roads, buildings, stream crossings, training exercises, and other installations or acts which affect soil and vegetation are to be designed with erosion and sediment in mind. The development of the park can be instrumented to the benefit of enhancement of downstream investments.

Gathering Field Information on the Areas to be Planned

On transforming the objectives of conservation into the series of practical directives presented in the previous section, it becomes quite clear that park planning depends heavily upon knowledge of the natural and cultural resources and the regional context within which they are found. Normally, there is a lack of information about the resources and about the current status of the regional context. For this reason it is usually indispensible that field work be realized as part of park planning.

The kinds of field information to be gathered will include:

> Biophysical factors, including topography, drainage, waters, climate, geology, soils, vegetation, fauna, fire history and special considerations which will affect planning, such as hurricanes, mass earth movement, floods, etc. Particular emphasis is given to unique formations and critical areas.
>
> Socio-economic factors, including current land uses, land-use trends, current use by visitors and analysis of current visitors.
>
> Historical-cultural factors, including history, archaeology, anthropology and contemporary cultures.

Field work can become a very time-consuming and costly activity if all details of background information are sought. However, severe limitations to the depth at which field work can be realized arise. First, personnel on the field trip have generally left aside other activities and responsibilities which cannot be abandoned indefinitely; and second, the distance and accessibility of most parks makes field work expensive. The logical question which must be asked is: "How much field work can be afforded?" This in part depends upon the amount of information which needs to be gathered, but also upon the cost of transport, perdiems, equipment and supplies for the field team, and the loss of the services of the team members from their other responsibilities.

Theoretically, the park planners should gather field information, item by item, until the value of the information appears marginal relative to the cost of continuing the field work. That is, beyond some point, each additional piece of information will cost more than it is worth.

Field work can be reduced to a minimum by following two major guidelines: First, a thorough review of all existing information should be made in the office. Maps, reports and surveys can be found in libraries, geographic institutes, other ministries and government departments. Second, the field work should be designed to answer specific questions posed by the planning exercise for the particular park. The office review of existing information should point to the areas of greatest deficiency. Most important, however, are those items of interest to the particular planning mission. Many topics are of general interest or significance, but only that information which will respond to the questions held by park planners is worth gathering. Every member of the field team should have a clear idea of the questions to be answered. (These questions will be noted in detail in Chapter V.)

These concerns raise a dilemma. It is excessively costly and inefficient to answer more questions in the field than require asking. Surplus information needs to be stored and classified; often it gets lost; if not utilized quickly it soon becomes obsolete and devalued. On the other hand, once the planners are in the field, with camp, food, personnel and equipment appropriately installed, it is relatively less expensive to stay in the field for an extra day or two to gather additional information than it is to return once again to the field later on. Common sense and simple accounting on field costs and other tasks to be done will generally guide the decision on the amount of field work which is justified.

It is generally advocated that wildlands destined to be managed as national parks require an intensive formal inventory. In light of the limitations upon park departments for personnel, equipment, supplies and funds for perdiem, it would appear more appropriate to gather information on an incremental basis through periodic field assessments as the information becomes necessary. A series of field trips over the years can produce information on a dynamic and flexible basis. Where the planners and managers consider the information to be too superficial, and the risk of error intolerable, a research project can be developed to clarify the problem. Major factors which warrant periodic review can be incorporated into monitoring programs. Over the years, these research and monitoring activities will supply up-to-date information on direct relevance to park management on such aspects as stream flow, animal immigrations, plant succession, habitat requirements, recreation impact and extent of archaeological ruins. Where the significance or function of particular sites remains in doubt, the planners can recommend that all options be kept open in the corresponding area until the uncertainties are clarified. In this way, planning, management and development can still move ahead in those areas where sufficient knowledge does exist about the natural and cultural resources to ensure their proper management. And, the limited resources available for field work are focused upon those questions which are in fact key to management decisions.

Of particular importance in field work is the identification of particular sites which will have direct affect upon planning. These CRITICAL AREAS are defined because they mark places where endemic species find their peculiar habitat requirements, where periodic flooding occurs, where soil-water conditions pose great difficulties to construction, or where avalanches are common. Such critical areas serve to orient research and monitoring, and to avoid costly mistakes in management and development.

The actual methods for field work will vary considerably from country to country, and from tropical forest to Andean mountain, and as such no attempt will be made to discuss field methods in detail. Furthermore, there are traditional practices and administrative procedures which may be more or less appropriate in terms of the kinds of questions being asked.

In general, however, field work will be realized in areas which are relatively remote. At the one extreme, there will be study areas which lie in relatively unknown wilderness where aerial photographs and map coverage is incomplete or non-existent; satellite imagery will be available, but actual on-the-ground verification will be limited.[8] On the other extreme, there will be the study area which is well described in scientific literature and has accurate aerial photographs and map coverage. Most cases will lie somewhere between these two extremes. Examples of field methods for relatively unknown and for relatively known areas are presented in Appendix III-A. Each example contains specific principles and guidelines. (The interested reader may find it useful to turn to the Appendix at this point.)

Resolving the Conflicts for the Use of Space within Parks

Conceptually, national parks can be planned to meet all of the ten objectives presented above. There are exceptions, of course, where for example no cultural structures or sites are found within a natural area. In most cases, however, virtually all of the objectives can be addressed to some extent. Each objective can be associated with one or more different types of benefits, such as protected genetic materials, opportunities for research, educational and recreation services, clear flowing water, sediment-free rivers, and the like. These benefits can be considered to be the OUTPUTS of national parks.

On the other side, national parks are made up of natural and cultural resources, along with facilities for transportation, communications, research, recreation and education and the personnel related to the various tasks of park management. These combined resources are the INPUTS of national parks.

The outputs which can be received from national parks will depend upon the inputs put into the parks. Obviously, something cannot come out of a park if the corresponding ingredients do not go into it.

More than a question of what ingredients are employed, there is the important matter of where they are put to work to produce the desired benefits. Perhaps this can be seen more clearly at first by developing an analogy. Imagine observing a shopper walking into a supermarket. In the shopper's hand is a shopping list which calls for meats, vegetables, fruits, packaged items and bottled beer. The shopper knows what he wants. Now, he must first become aware of what is actually available. And he is interested in examining the quality of the food. "Not just any tomato, papaya or porkchop will do!"

To assist the shopper and the store manager organize themselves, the store has been sub-divided into sections where specialized techniques have been utilized for the storage and display of items. What requires cold storage has been given refrigeration. What needs fresh air, shelves, scales, or the assistance of helpers, has been so provided. Furthermore, signs help the shopper to easily note where each item of food is available for sale.

The shopper moves through the store, selecting the items which he wishes. Even though he had hoped to purchase tomatoes, their quality may be so low that he decides to pass them by. On the other hand, he may have had no intention of purchasing lemons, but because the display was so attractive and accessible, he decided to get a few.

This example of the supermarket demonstrates several important factors analogous to park management. The shopper did not run all over the store. He or she followed the established aisles, moving from one area to another searching for the items on the shopping list. The shopper was not able to purchase everything on the shopping list; some items may not have been available during the particular season; other items were in poor quality, and perhaps others were only available in another store which is specialized in that type of merchandise. While the shopper did not find everything initially desired, other items were picked up on impulse.

Imagine now the contrast of a supermarket which is not organized to assist the shopper and the store manager. Cans, lettuce, sausage, cheese, beef and eggs might all be in one pile. Either the cans would get frozen, or the meat would rot, and the eggs and bread would get crushed beneath the cases of beer. The shoppers would be walking all over the food as they scrambled for items piled in every which way. The shopper would obtain disastrous food and the store would not last long.

The park planner has a problem a hundred-fold more complex although the principles are similar. Representative natural areas can be managed in perpetuity only if perturbations are kept to a minimum. Fragile ecosystems must remain free of conflicting land uses. Recreational use can take place on sites with sufficient resistance to physical impact. Educational activities can foster where a serious study environment can be maintained. Long-term monitoring and research projects require exclusive use of particular areas. Visitors wish to enjoy nature and culture in an environment relatively free and unencumbered by unnecessary regulations. How can planners design these opportunities when they conflict amongst each other for the use of space?

The conflict for the use of space is resolved through a planning technique called ZONING. The territory of the park is sub-divided into three types of units: ZONES, DEVELOPMENT AREAS and SITES. Each is a unit of land which is to be managed and developed to fulfill a particular objective (or set of objectives) of the park. All of these objectives are directly related to those for the park, the park department and the national development plan. Figure III-7 illustrates graphically the hierarchy of interrelationships between each zoning unit within the park, and national development objectives and plans.

LEVELS OF MANAGEMENT OBJECTIVES

1. National Objectives for Development
2. National Conservation Objectives
3. Wildland Objectives
4. National Park Objectives
5. Objectives for a particular NATIONAL PARK
    a. Objectives for each ZONE
    b. Objectives for each DEVELOPMENT AREA
    c. Objectives for each SITE

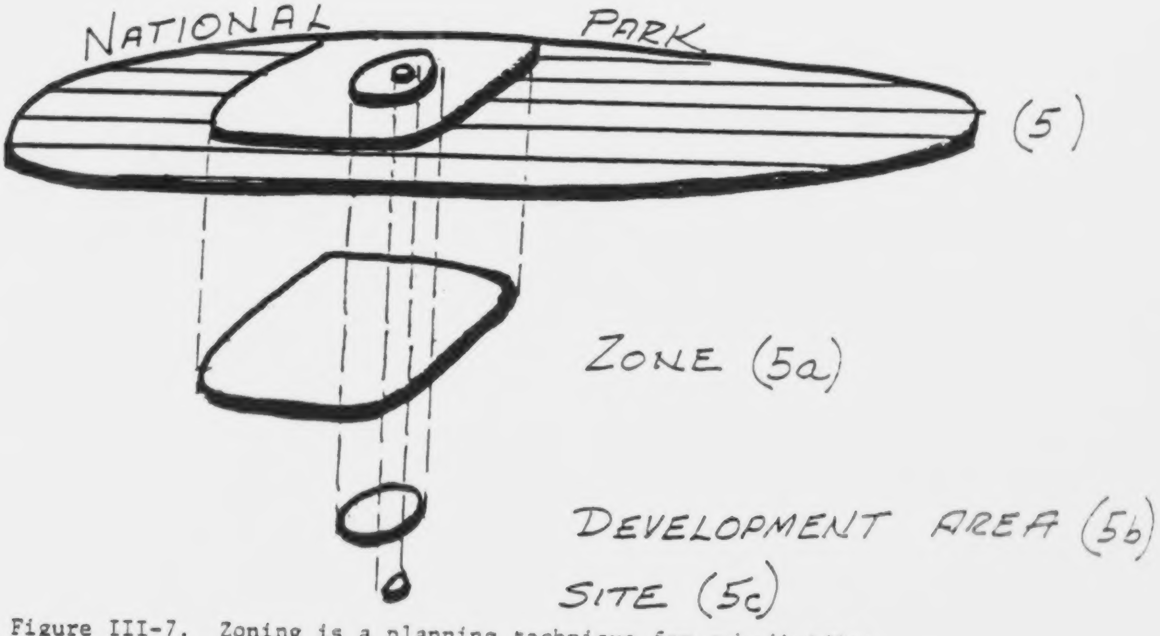


Figure III-7. Zoning is a planning technique for sub-dividing parts into units which focus upon management objectives.

There are many kinds of zoning, all of which are valid depending upon the use to which they are to be put. Topographical, landscape, forest and ecological type or zone classifications are normally designed to describe natural resources. The park planning zone differs in that it is designed to prescribe management activities for particular areas. The park zone does not describe what is found in the natural resources, but rather, prescribes how these resources will be allocated and employed.

The purpose of zoning is to divide a large wild area into units which are capable of being managed to meet specific objectives. Zoning reduces the magnitude of the planning problem into pieces which the human mind can grasp. Zoning does not show where the forest, mountains, biomes, habitats or particular species are to be found. Rather, it shows where management must act in different ways to meet the objectives of the park. For example, where should rare or threatened species be provided the fullest possible protection? Where can scientists study and live? Where can visitors be welcomed and provided opportunities for an exciting, enjoyable and educational experience?

Parks are first sub-divided into management ZONES which are capable of fulfilling particular objectives. Two factors come into play: First, the natural and cultural resources have peculiar characteristics and capabilities. Second, managers must do something to maintain or enhance those characteristics or capabilities in order to ensure that objectives are met, both now and in perpetuity. Thus, one zone may be particularly suited to the maintenance of genetic resources and the sample of a major biological unit. Here, management may be required simply to provide protection against external influences. Another zone may possess outstanding natural beauty and a general absence of fragile resources or endangered species. This zone may be ideal for extensive human uses in recreation, education and research, and thereby require various facilities and management activities. Still another zone may lack outstanding resources but have easy access, good drainage and no fragile areas. This zone may serve well for receiving visitors in more intensive ways, for example, housing and the like.

Where physical development is required to support management in meeting zone objectives, DEVELOPMENT AREAS are established. Some zones will not require any physical facilities and as such, will have no development areas. In cases where visitors are permitted, however, it is virtually always necessary to provide various kinds of developments such as road access, communications, sanitation, protection, guide services, signs and even buildings. Within the zone devoted to recreation, it is in one or more development areas where most facilities and services are provided. In the scientific zone, a development area may feature a research station and dormitories. The most highly protected zone may need no physical development to fulfill the zonal objectives.

Action takes place at SITES within each development area. Picnic areas, toilets and parking lots are sites within a recreation-oriented development area. A research laboratory and scientist dormitory are sites within a research-oriented development area.

All zones, development areas and sites are elements of the national park. The zone is a conceptual entity, the borders of which are noted only on the manager's maps. The development areas are marked and controlled areas where considerable management attention is focused. Sites are physical places where actual implementation takes place. All of these sub-divisions are interrelated and interdependent, that is, they are all components of the same enterprise. Each functions as a part of the whole. And, where each sub-division has been derived as a necessity to meet park objectives, then all sub-divisions are equally relevant and important elements of the park.

The use of these sub-divisions in park planning and management make it possible to analyze a park and its component parts, in abstraction. This means that once field information has been gathered, the planning team can place their ideas on maps. They can consider places which are many kilometers away. They can try out different ideas for management and development of the park by modeling alternative plans on paper.

The sub-divisions of a park provide planners and managers with a method for cross-checking internal consistency of alternative plan proposals. The zones, taken together, must provide for all of the objectives of the park. If an objective is not explicitly addressed, one or more zones are missing or need replanning. The development areas concentrate and focus the action of management and development within the zones. If man is physically involved, there must be a development area to receive him, to provide him information and sanitation, to protect him and keep him from directly or indirectly damaging the resources. Similarly, a development area attends to the requirements of the scientist, environmental education and monitoring. Finally, the sites show exactly where these physical activities take place. If there is no site suitable for a particular facility needed in the development area, then a new development area where such a facility can be appropriately built must be located within the zone. Similarly, where a suitable development area cannot be found within a particular zone to focus management activities of the latter, then perhaps the zone borders need to be reconsidered.

In this way, by abstraction and by cross-checking, the internal consistency of alternative management and development options can be considered before any actual physical development takes place. No bulldozers, nails or concrete need be purchased and run onto the park to "try out ideas." Each park function -- research, watershed protection, environmental education, recreation, genetic resources protection, etc. -- can be "tried out" and tested on paper and in the minds of the planners and managers.

Where conflicts of space arise, solutions can be sought by examining the zones, development areas and sites. This is done by so-called horizontal and vertical analysis: First, the planners check (horizontally) across the zone-level sub-division to search for inconsistencies which may give reason for conflicts in the use of park space. Similarly, the planners check across the development areas and sites. Then, the planners check (vertically) from zone, to development area to site, and return. In either the horizontal or vertical mode, the reasons for the conflict can usually be found.

Zoning is the planning technique by which all of the resources of the park are provided appropriate protection and are made accessible to man. However, access occurs in both conventional physical terms and indirect abstract terms. The resources of each zone are dedicated to man-oriented purposes, but an integral and holistic point of view concerning "access and use" should be taken. For example, the maintenance of the human habitat, the security of future foods and medicines and the development of greater environmental understanding are all directly related to human welfare. Access and use to all these benefits are provided to humans through a carefully zoned park, but this does not require that people walk all over the resources. Furthermore, human access to and use of these benefits normally requires that, in fact, the resources be managed to keep humans away from certain areas. Returning to the analogy of the supermarket, the shopper did not climb around the refrigeration machines in the basement of the store as he purchased his meat and dairy products, he was content to be offered well preserved foods.

Some zones are oriented to the direct benefits while others focus primarily upon indirect benefits. The direct benefits, those which are received by man in near final form, are generally of higher value than those which are in intermediate form. Hence, recreation and tourism services are more highly valued by the market (by people in general) than genetic materials. Clearly, this is a case of human perceptions: man enjoys the recreation experience -- he, himself receives the benefits. But, genetic materials? Who will get the benefits and when? Thus a major challenge of park management is to expand human awareness of these little-perceived, and little-valued benefits. So long as the outputs from particular zones are little-valued, the zones themselves will be considered to be of low-value.

Worse yet, a resource which is not tied to a benefit which man perceives, is "worthless." Either a resource is identified as a raw material to some final or intermediate product or service, or it is simply not a resource. The solution to under-valued resources lies not in converting the park into a cash business but to relating all of the benefits to humans. To the extent that the ties between man and wildland resources can be demonstrated, those resources become valued. The zoning technique aims to explicitly tie each resource to particular objectives. In this way, each zone produces a special bundle of benefits which are linked to national development objectives.

Among the various levels of planning, from the national development plan down through the zones, development areas and sites within a park, it is the ZONE which is the primary unit of production. Zones are designed and organized to do something specific. They are planning and production entities; that is, they are the organs, tissues and muscles which fit together in an interrelated and interdependent manner to form the park body. Each activity at a site (within a development area of a zone) is related to the park plan, the wildland policy and the national development plan.

To contribute to eco-development, wildland resources must be managed on an INTEGRATED basis. Three approaches are suggested: First, the HORIZONTAL INTEGRATION approach considers the broad range of potential uses to which wildland resources can be devoted. The same resources of the park can support research, recreation, water production, and the maintenance of genetic materials. A horizontally integrated park will produce many or all of these benefits. This approach focuses attention upon the maintenance of management flexibility so that shifts can be made from time to time to emphasize one benefit over another as natural and cultural resources and national demands chance. Thus, when requirements for medicinal research or pollution monitoring are important to national conservation and development efforts, these activities can be expanded by minimal shifts among other activities. While wildland resources are generally flexible, physical developments can easily become inflexible. Roads, bridges, buildings and power lines can be rigid. In the extreme case, wildland resources can become "locked-in" to a specific use because of physical development. If any particular use loses its priority, the related resources can become "useless" unless it can be rededicated to another objective.

A second approach is VERTICAL INTEGRATION which considers the elaboration of primary wildland resources into more highly-valued benefits. Many major activities, such as research and recreation, can be managed and developed at levels running from primitive to final form. A park which features vertically-integrated research will offer, in addition to opportunities for research, the dormitory and laboratory facilities, a library, field sites, a publication for scientific information and scientific advisory services to the national planning board and universities. In recreation, the park may operate a public transport system, food services, camps and guide services. Vertical integration adds value to the work of the park. It also takes advantage of opportunities which otherwise might be left undeveloped.

Vertical integration can become complex, however. In extreme cases, the park could begin to function like a scientific institute or a tourism bureau (with booking services and advertising). The danger of "over-verticalization" comes when the research or recreation operations become such important activities in their own right that the management and custodianship of wildland resources is neglected.

Third, wildland resources may be managed to produce more highly-valued benefits by combining both the HORIZONTAL and VERTICAL INTEGRATION techniques. A park may be designed to provide adequate clear water to downstream irrigation works, recreation services for tourism, research facilities for agricultural breeding and monitoring facilities for earthquake prediction.

The combination of horizontal and vertical integration provides an approach for taking full advantage of all resources and their possible uses, and for considering the means and extent to which each should be managed and developed. However, care must be given to avoid overemphasizing the more-valued benefits at the expense of the less-valued or potential benefits. The danger lies in investing in the high-value activities, like tourism, to the neglect of indirect or less elaborated benefits, like watershed protection, which may be more critical to the human habitat.

Finally, these approaches to integration serve to ensure the internal harmony of the park, and the harmony of the park with its surrounding region and the nation. The planners and managers can check that uses which are potentially competitive are carefully separated in the space of the park. A check can be made to ensure that adequate flexibility is maintained so that high-value outputs do not dominate current activities at the expense of options for tomorrow. The park can be shown to support the key line items of the national development plan, such as: water conservation, flood control, rural employment, foreign exchange earnings, education, agriculture, forestry and fisheries management and disaster warning systems.

Seven basic and fundamental types of zones have been suggested.[9]

Intangible or Scientific Zone -- A ZONE which consists of natural area which has received very little human-caused alteration, contains unique or fragile portions or elements of ecosystems, and species of flora or fauna or natural phenomena which require relatively complete protection from other than natural influences. The ZONE is dedicated primarily to those objectives related to scientific research, environmental monitoring, ecosystem protection, genetic resource protection and specifically excluded from the ZONE are roads and the use of motorized vehicles.

The general management objective is to reserve the natural environment providing only for scientific uses and non-destructive administrative and protective functions.

Primitive Zone -- A ZONE which consists of natural area which has received little human-caused alteration. The area can contain unique portions or elements of ecosystems, and species of flora and fauna as well as natural phenomena which while the scientific interest are sufficiently resistant so as to tolerate very moderate public use. Specifically excluded are roads and motorized vehicles.

The general management objective is to preserve the natural environment and at the same time to facilitate scientific research, environmental education and primitive forms of recreation.

Extensive Use Zone -- A ZONE which consists principally of natural area but also may contain area with human alteration. The ZONE contains examples of the general scenery and the significant features of the park and possesses kinds of topography and land-use capacity which can be developed for educational and recreational activities. Such activities are always developed within an environment dominated by the natural features of the area. This ZONE represents a transition between the road-less intangible or scientific and primitive areas where human impact will remain at a minimum and the areas of higher human concentration and impact.

The general management objective is to maintain a natural environment with minimum human impact while providing access and public facilities for educational and recreational purposes. Large concentrations are avoided.

Intensive Use Zone -- A ZONE consisting of natural or man-altered areas. The area contains individual sites of outstanding scenery, resources which lead themselves for relatively dense recreational activities, and the topography can be developed for the necessary transit and support facilities. The environment is kept as natural as possible, but the presence and influence of concentrations of visitors and facilities are accepted.

The general management objective is to facilitate environmental education and intensive recreation in such a manner as to harmonize with the natural environment and which causes the least possible negative impact to the environment and the natural scenery.

Historical-Cultural Zone -- A ZONE which exists in areas where historical, archeological or other human cultural manifestations are found which are to be preserved, restored and interpreted for the public.

The general management objective is to protect the artifacts and sites as integral elements of the natural environment for the preservation of the cultural heritage. The ZONE is developed for related and consistent educational and recreational uses.

Natural Recovery Zone -- A temporary class of ZONE which consists of areas where the natural vegetation, fauna or soils have been severely altered or eroded, or of significant areas where introduced exotic species are to be eradicated and replaced by natural elements of the ecosystem by specific management projects. Once rehabilitated, the ZONE will be reassigned to one of the permanent categories.

The general management objective is to detain the degradation of the resources or to obtain the restoration of the area to the most "natural" state possible.

Special Use Zone -- A ZONE which consists of reduced relatively small extensions which are required for administration, maintenance, development and other activities which are basically inconsistent with the management objectives of national parks. Also included are activities and structures which are independent from park management and inconsistent with it.

The general management objective is to minimize the negative impact of these facilities on the natural or cultural environment. Those activities and structures which are non-park related, such as communications, water works, cables, buildings, farms and fences, will be removed as opportunities arise.

To meet the general objectives of the national park category, an idealized minimum park must have the capacity to maintain one or more ecosystems, facilitate research and monitoring, and provide for recreation and education for the general public in designated areas. In this sense, the suggested zoning for the minimum national park would include an intangible or scientific, primitive, extensive use and intensive use zones. These four zones could cover nine of the ten objectives of national parks. The cultural objectives could be added by including an Historical-Cultural Zone. The National Recovery Zone and Special Use Zone are added where necessary.

Into the basic zones are added DEVELOPMENT AREAS as necessary to focus management activities and development.

An idealized minimum park capable of contributing to eco-development is presented in managerial terms in Figure III-8. If only the area to the left of the a-b axis is considered, this is not a park but a scientific or "biological reserve." On the right, taken alone, there is a "recreation area." Where cultural values exist, they would be added. And, the whole enterprise supports rural development, water and soil conservation and downstream protection.

An aspect of zoning which leads to considerable confusion is the so-called BUFFER ZONE. The concept is clear: Special resources or habitats are to be surrounded by a strip of land which can act as a barrier to external influences. This strip is to be sufficiently wide to absorb chemical and physical disturbances, such as air, soil or water contamination, fire, poaching, uncontrolled tourism, and noise. It is the area where protective action, such as fire suppression, takes place.

The function of the protective strip is to buffer. Thus, it is a process-oriented concept. The size and shape of land required to do the buffering will depend upon the influences to be controlled.

Two applications of the buffer concept are relevant to planning national parks: First, there is need to buffer the effects of intensive activities within the park upon other areas of the park. This internal buffering is accomplished by ensuring a smooth transition from one kind of activity to another along zonal margins. Figure III-9 illustrates the application of the intra-zonal buffer. In this way, buffering is a function of each of the aforementioned zones rather than a zone in itself.

Second, there is need for a strip to buffer the effects of activities external to the park. This may require cooperative planning with neighboring land uses. However, it cannot be assumed that the neighbor should forego using his land which runs adjacent to the park boundary. Why should the National Forest, cooperative or private firm avoid utilizing those hectares? What is the motivation? Who will reimburse them for their losses suffered by not harvesting timber, grazing cattle or growing wheat? The bias of conservationists suggests that the park should be wild and natural right up to the boundary, and that the neighbor should do the buffering! However, similar to the intra-zonal transitions there must be a gradient at the boundary as shown in Figure III-10.

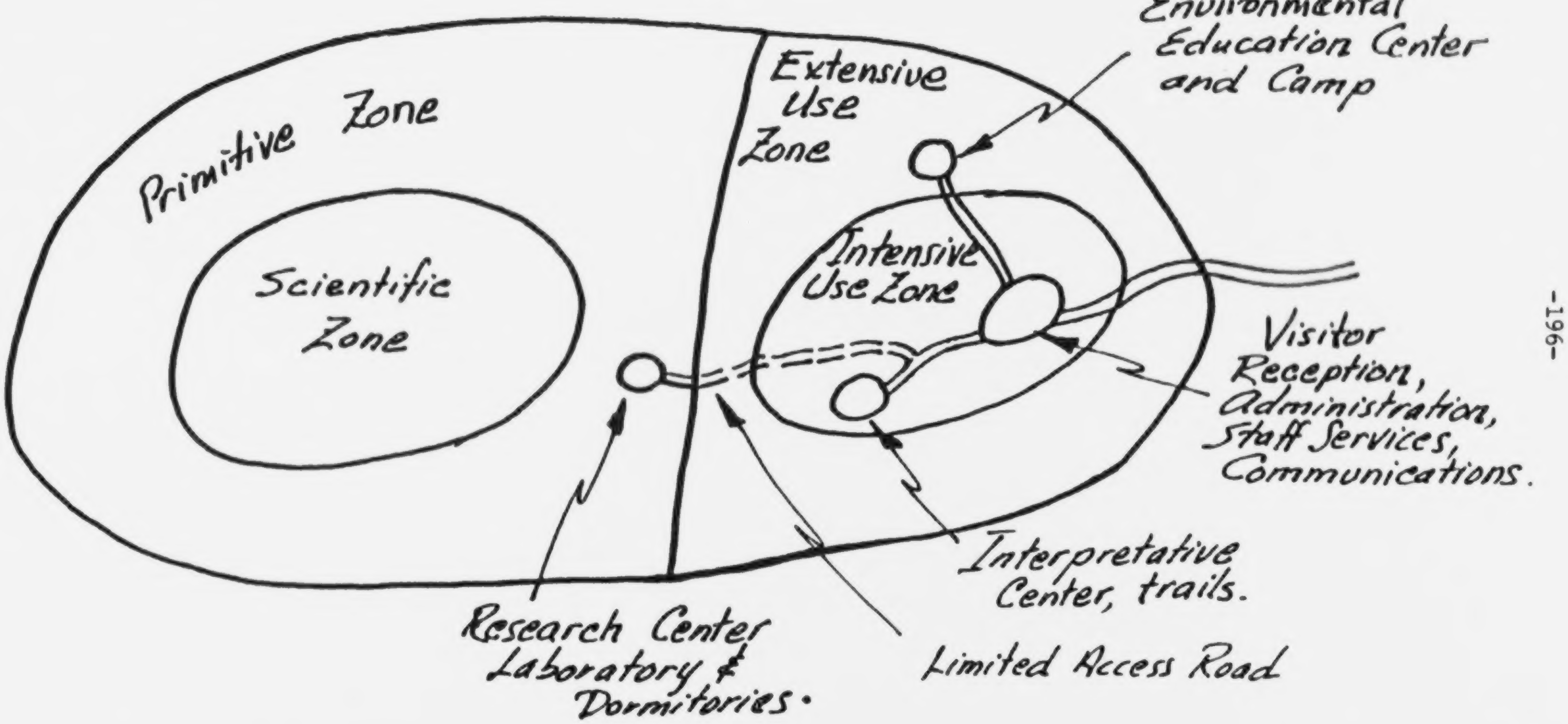
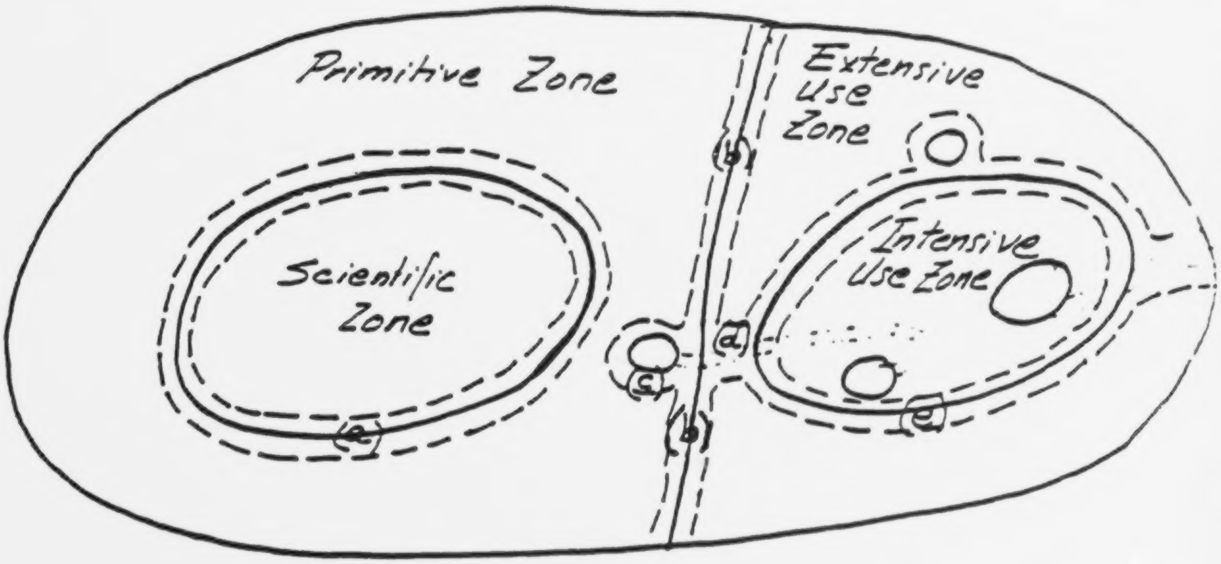

Environmental Education Center and Camp
Extensive Use Zone
Primitive Zone
Intensive Use Zone
Scientific Zone
Visitor Reception, Administration, Staff Services, Communications.
Interpretative Center, trails.
Research Center Laboratory & Dormitories.
Limited Access Road

Figure III-8. An idealized and minimum national park is capable of addressing the conservation and development objectives related to the national park category of wildland management (as shown in Figure II-1).



a) Transition from primitive to scientific to absorb human recreational effects. Area within the strip is recognized by scientists as potentially affected by human use.

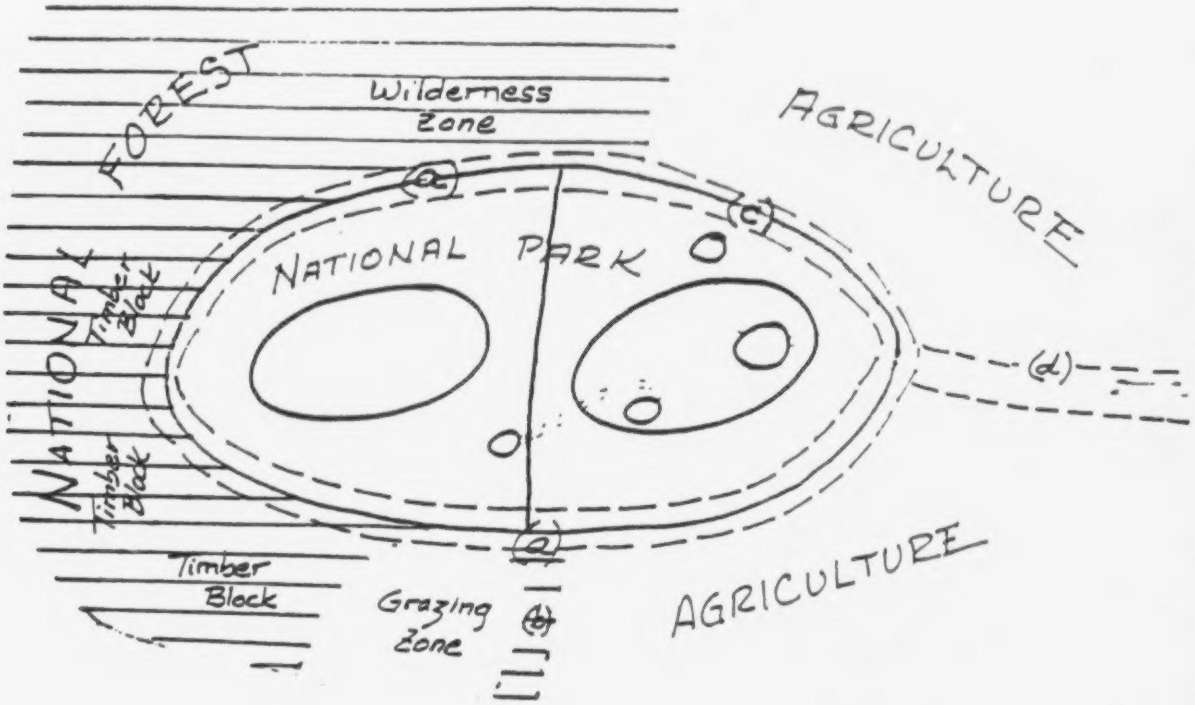
b) Transition from recreation-education zones to the conservation-scientific zones forms the gradient from mechanized to primitive envornment.

c) The area surrounding the research station is effectively under human influence and is so recognized. Study plots may need to be located some distance from the station.

d) The margins of the special use road are in fact affected by road construction, light, limited traffic, fumes and noise.

e) The transition from intensive to extensive is more subtle and gradual as human presence and physical developments decrease.

Figure III-9. Buffering between zones is treated as an element of zone planning.



a) The transition from National Park to National Forest is buffered by a strip in the Park and Forest where both institutions recognize and cooperatively plan and manage to minimize adverse effects from logging, grazing or wild fauna.

b) The National Forest utilizes the buffer concepts along its boundary with agricultural land-use by maintaining a strip of forest.

c) The Park plans a buffering strip in cooperation with neighboring agriculturalists to minimize conflicts of fire, domestic plants and animals on the park, and of wild animals on the farms.

d) The margins of the access highways can be maintained in appropriate landscape through cooperative agreements with other institutions or land-users.

Figure III-10. Buffering along the external boundary is incorporated into the zones of the park and can often be enhanced through cooperative management with neighboring land users.

On the one hand, general experience demonstrates that park boundaries eventually become characterized by drastic changes between nature and agriculture, timber production or even urban development. In this case, the buffering function must be planned along the inner face of the park itself. The transition strip to non-park uses is a vital element of the park and is logically included as an element of the park.

Alternatively, where the national park can be planned as a part of wildland regional planning, the park can become a sector in a much larger area, much of which may retain wildland characteristics. Forest may surround the park; animals may move freely from park to surrounding lands. The adjacent lands may be managed for timber, hunting, fishing water, or low-to-minimum technological levels of agriculture or animal husbandry. All of these uses may be rotated with forest. Both areas are illustrated in Figure III-11.

A "buffer zone" as such will therefore not be included among the zones of parks. Rather, BUFFERING is included implicitly as a function of the zoning exercise to establish a careful transition from one land use to another, both within, as well as on the boundary of parks.

The transition or GRADIENT between zones within the park can be smooth and harmonious where zones have been properly integrated. The change from one zone to the next should be hardly noticed except by the differences in land use. Improper integration of zoning is easily recognized by the conflicts which arise, including recreationists walking through research areas, vehicles in back-country wilderness, large mammals passing regularly through campgrounds, fishing in areas managed for snorkeling, or vanishing species losing habitat requirements to human activity.

Similarly, a smooth gradient can ideally be established between the exterior zones of the park and the surrounding external land uses. While more difficult to control than the transitions within the park, planning can work to establish a smooth a gradient as possible. Common indications of abrupt transitions in land use at the park boundary include intensive agriculture or husbandry adjacent to the park, wild herbivores from the park destroying the neighbors corn fields, domestic stock entering the park, and overgrazing and erosion along the boundary. Occasionally, the planners will find that limited options force the need for abrupt gradients between the park and the adjacent lands. Exceptionally, roads or even fences may be required to "force" the transition from the park to neighboring land uses.

Thus, zoning is an important planning tool to organize the park to meet management objectives, and to establish a clear production orientation to management where outputs and inputs can be clearly identified. And, zoning can serve to ensure the proper integration of the park into the surrounding region.

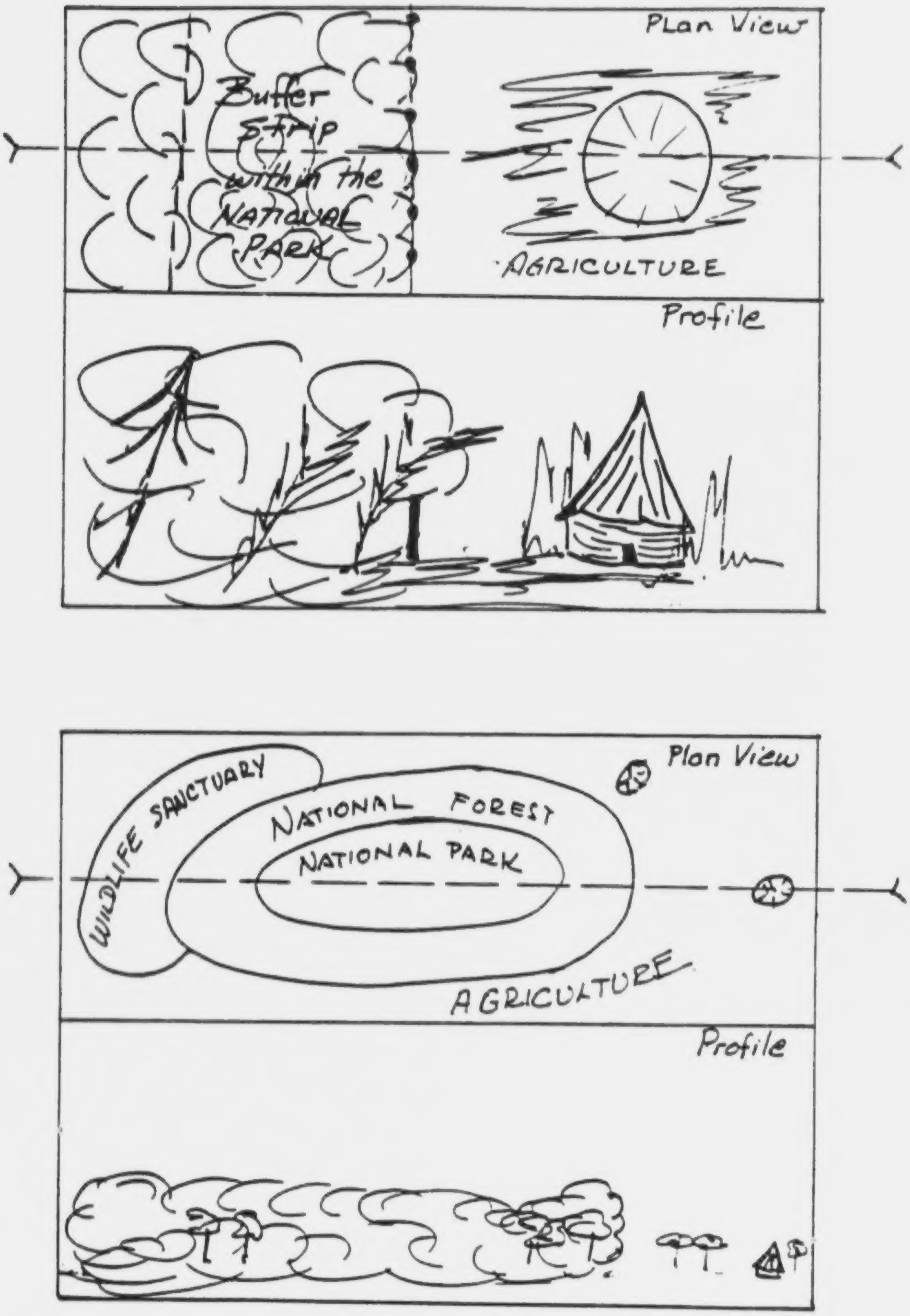


Figure III-11. The external boundaries of national parks are commonly characterized by drastic shifts from wild nature to agriculture, tree plantations, urban settlements and erosion. Wildland planning provides for the possibility to combine parks with other wildland categories.

Establishing Boundary Lines for National Parks

The zoning exercise has shown where the various objectives of management can be met. The collection of zones makes up the necessary elements which, when taken together, make up a whole national park.

A line extended around the exterior of the set of zones is the BOUNDARY of the national park. The boundary merely functions as a frame around the park. Ideally, the relationship between zoning and establishing the appropriate boundary line is analogous to building a jigsaw puzzle, where once each piece is placed together in its proper position a picture is produced (which probably was not evident in the individual pieces). With the picture together, a frame can be made to enclose it and protect its edges.

Commonly, however, the boundary line is established by law prior to there being a plan for the area. In many countries this is necessary in order to provide the legal basis for management planning of the area as a national park. Critical is whether the planners must accept the boundary line as given by the law, and confine their planning efforts to the territory within the designated park, or whether they can study a larger area and perhaps recommend certain changes in the boundary.

The boundary decision is based upon several management guidelines:

1) The boundary circumscribes the component zones of the park.

2) The boundary line itself must be located along breaks in natural topographic or land formations. Mountain ridges or watershed divides are logical boundaries which separate one area of influence from another.

3) The line should be round wherever possible to minimize the rates of species replacement between the park and adjacent lands. Serate or odd-shaped lines are to be avoided.

4) Care must be given to ensure that the gradient of land use from the park zones to the adjacent lands is as gradual and consistent as possible. It must buffer both the park from adverse external influences and the adjacent lands from predators or other unfavorable elements of the park. Where possible, abrupt changes in land uses are to be avoided. Most favorable are gradual shifts from park to forest reserve or wildlife sanctuary to tree farm or fruit tree crop to agriculture and grazing.

5) Finally, the boundary line must be practical. It must be located to permit patrolling by park personnel on horseback, foot, vehicle, boat or perhaps aircraft. While mountain ridges may be impossible to patrol they may serve as natural boundaries which need little attention. Rivers, lakes and coastlines are practical boundaries, but care must be taken to avoid cutting across valuable ecotones.

Thus, the boundary decision is an interdependent part of the planning process. The zones prescribe a boundary which is then checked for its gradient and buffering capabilities and its usefulness for protection and patrolling. The boundary decision will normally raise doubts about some aspects of the zone lines. Such doubts will force the planners to re-think earlier decisions, and later, return to the boundary. The boundary decision is an excellent example of how park planning can be programmatic for identifying and correcting internal inconsistencies in management.

Designing Management Programs

The boundary decision has located the territory necessary to meet the objectives of park management. It also denotes the periphery necessary to define and defend the natural or cultural resources to be managed as a national park.

Now, to make the park more alive and meet the objectives, some action is required. The managers must do something! First, conceptual activities are planned as a series of MANAGEMENT PROGRAMS which are statements of requirements, norms and standards for the action necessary to achieve park objectives. Second, and subsequently, the programs are itemized into specific activities to form the INTEGRATED DEVELOPMENT PROGRAM.

Each MANAGEMENT PROGRAM has specific objectives which are derived from the overall park objectives. Most parks require several management programs to cover the various types of work to be accomplished. Ideally, a park will require three fundamental programs:

1) ENVIRONMENTAL MANAGEMENT PROGRAM includes all activities related to protection, resource management recreation and tourism.

2) INTERPRETATION AND RESEARCH PROGRAM includes all management activities related to interpretation, education, research ad cooperative science and monitoring activities.

3) ADMINISTRATION AND MAINTENANCE PROGRAM includes all management activities which support other programs, such as personnel, finance, purchasing and storage, training, the maintenance of all facilities and equipment, and public relations.

All three programs are inseparable if the park is to be operated effectively. Questions or doubts on wildlife management, road construction or information for the educational activities are passed to the research segment of the interpretation and research program. The results guide the environmental management and the administration program. All programs and activities depend upon the support of administration and maintenance. The repair of roads, smooth running order of vehicles and the timely disbursement of salary checks are vital to park operations. The public comes to the park to enjoy natural and cultural heritage. The environmental management program makes that possible, but with clear dependency upon the other two programs.

Each program can be sub-divided into specific sub-program areas, such as:

- ENVIRONMENTAL MANAGEMENT PROGRAM
  - Protection Activities
    - Visitors
    - Natural Resources
    - Cultural Resources
  - Resource Management Activities regarding
    - Endangered Species
    - Habitats
    - Watersheds
    - Genetic Materials, etc.
  - Recreation Activities
  - Tourism Activities
- INTERPRETATION AND RESEARCH PROGRAM
  - Interpretation Activities
  - Education Activities
  - Research Activities on
    - Resource Management
    - Interpretation and Education
    - Recreation and Tourism, etc.
  - Cooperative Scientific and Monitoring Activities on
    - Environmental Monitoring
    - Cooperative Projects
    - Global Bench-Marking Projects, etc.
- ADMINISTRATION AND MAINTENANCE PROGRAM
  - Administration Activities
    - Personnel
    - Training and Career Development
    - Finance and Accounting
    - Archives and Library
  - Maintenance Activities
  - Public Relations and Extension

The ENVIRONMENTAL MANAGEMENT PROGRAM can be sub-divided into four integrated units: PROTECTION involves the activities of the rangers and conservation officers, who as field managers are responsible for implementing and operating the park plan. Their efforts focus particularly upon the protection of the visitors to the park and of the natural an cultural resources. RESOURCE MANAGEMENT activities are designed to treat endangered species, habitats, watersheds and genetic materials, as necessary. RECREATION activities are designed to provide for the enjoyment of visitors in ways which are as consistent as possible with visitor preferences and park objectives. TOURISM activities relate the park to the network of highways, restaurants, hotels, information services, guide services, the management of visitors, etc., in the region, nation and world.

The INTERPRETATION AND RESEARCH PROGRAM can be sub-divided into four specific areas: INTERPRETATIVE activities involve the visitors with the natural or cultural values of the park. EDUCATION activities involve groups of visitors in more formal encounters with the natural or cultural environment. RESEARCH activities are designed to support the management of natural and cultural resources, the interpretative and educational efforts and recreation and tourism. And, the COOPERATIVE SCIENTIFIC AND MONITORING activities are designed to study, monitor and assess natural and cultural resources of the park and their management and use.

Finally, the ADMINISTRATION AND MAINTENANCE PROGRAM considers the means for operating the aforementioned activities. The ADMINISTRATION activities support all other sub-programs through the recruitment and management of personnel, training and career development, finance and accounting, purchasing and storage of supplies and equipment, and files and library. Also under ADMINISTRATION come contracts for construction, the management of concessions, health inspection and the like. The MAINTENANCE activities backup all others by serving to keep all capital investments and equipment in operating order. The ADMINISTRATION and MAINTENANCE sub-programs are vital to any park and serve to integrate all other activities. And, PUBLIC RELATIONS/EXTENSION activities seek to relate the values, objectives and services of the park to the local community, adjacent land users and public and private institutions.

Each sub-program will be most efficient if it has a particular MANAGEMENT CONCEPT in which the objective, activities, standards and norms, requirements for manpower, and supplies and equipment are successively stated. The inputs can be itemized for the ease of subsequent cost calculations.

The management concepts for the various management sub-programs provide the basis to plan the DEVELOPMENT of the park. The central question of development is: What ingredients must be added to (or removed from) the natural and cultural resources to allow the management activities to be implemented? Development adds the missing elements prescribed by management decisions.

The preparation of the various management programs required an analytical approach to fully understand all the elements needed to run the park. The INTEGRATED DEVELOPMENT PROGRAM, on the other hand, requires synthetic approach to bring together all elements of management which require some type of construction, equipment or increase in human or institutional capacity. It brings together the diverse ingredients of each management activity and enumerates them into development items: FACILITIES and INSTALLATIONS, such as buildings, laboratories, ranger cabins, etc.: TRANSPORTATION, e.g., roads, parking lots, docks, etc.; UTILITIES, e.g., electricity, water, sewage, garbage disposal, etc.; STAFF DEVELOPMENT, e.g., scholarships, training courses, study tours and in-service or on-the-job training, etc.; COMMUNICATIONS, e.g., radio, telephone, mail, etc.; INSTITUTIONAL FACTORS, e.g., laws, regulations, administrative procedures, interdepartmental agreements, etc.

A DEVELOPMENT CONCEPT can be prepared to state successively the kinds and amounts of elements which must be added to the natural and cultural resources so that management may attempt to meet the objectives of the park. A list of development items serves to focus the attention of planners upon the implications of each type of action. What will the various buildings and roads do to the environment? Will the radio network connect the field staff by key locations? Are there overlapping developments, i.e., two facilities which can accomplish the same activity? Are there missing links, i.e., some management activity cannot be implemented because necessary facilities have not been analyzed? And, attention is drawn to the relationship between developments inside the park and the surrounding region. Do roads, communications and tourism link together, now and in the future projections for the area?

Conceptually, development is an aspect of management which focuses upon the capital, human and institutional elements that need direct intervention. Management concepts outline what is to be done to operate the park. The planners then must ask, "What elements do not already exist and must therefore be added?" They must at this moment recall the mandate of stewardship. Their loyalty is to the resources and the outputs. At this instant the planners become conservative conservationists. Any and all suggested modifications to natural or cultural resources are to be scrutinized with skepticism. All alternatives should be doubted until proven necessary and well designed.

The orientation of the planners is to visualize the various activities of the management programs in full operation. Conceivably, a park could contain all the necessary ingredients -- natural, capital, human capacity -- and the plan could be implemented with no developmental requirements. More typically, however, some facilities, staff training courses, water lines and regulations are needed. All "additives" are acceptable to the extent that they permit the program to operate and at the same time avoid erosion, species extinction, aesthetic pollution, congestion, or the interruption of natural processes.

In this way, the management process makes decisions about development. Development is a consequence of management. Figuratively speaking, the horse is in front of the cart: man is driving the bulldozer.

Analyzing and Evaluating Proposals and Alternatives

The management program and the integrated development program, taken together, present a practical statement of the action necessary to meet the objectives of the particular park. Before these programs are fully accepted, however, they should be checked for consistency by an ANALYSIS and EVALUATION.

The outputs and inputs are analyzed in terms which conform to the objectives and policies of the national development plan, the park service and the park. The OUTPUTS can be stated in terms of (a) quantity and quality of natural ecosystem(s) to be protected, (b) amounts and kinds of recreation services, (c) expected impact on rural economy, (d) quantity and quality of managed watersheds, erosion of sediment-prone areas, (e) facts on protection of downstream agricultural, industrial or urban areas, (f) facts on stabilization or use of marginal lands, (g) protection of genetic resources of general or particular interest, (h) research and monitoring in relation to international cooperative projects (such as MAB, UNESCO) with implications on support for agriculture or natural disaster warning (earthquake, volcanism, storm, disease), (i) expected impact on education for local residents foreign visitors, school children and university students.

INPUTS are expressed in conventional and standard units as used in public budgets and construction plans, e.g., (a) various types of buildings, roads, bridges, parking lots, gates, etc., in units of square meters and linear meters, and by quality classes; (b) numbers of personnel at various levels of competence and skill, e.g., university graduate, ranger, guide, skilled-laborer, unskilled-laborer, etc.; (c) numbers and types of vehicles; (d) numbers and types of radio units, (e) signs, fences, power transmission poles and line or cable, etc. Also, there is the need to state, as an input, the amounts and kinds of wildlands to be utilized (wildland capital).

The OUTPUTS are compared to the OBJECTIVES. Are the objectives met by this alternative? A proposal can be considered to meet the objectives when it appears, by all technical, economic, ecological and political scrutiny, that the outputs will meet the expected requirements. This decision will always rely heavily upon the experience and judgement of the managers and planners.

The INPUTS are compared to the CONSTRAINTS. Are the required inputs reasonable? Can the park service possibly be expected to supply such kinds and amounts of people, jeeps, and building supplies? Trends in government spending, government policies on civil service and contrast labor, the preparation of forestry graduates with specialization in wildlands or parks, all serve to orient this decision. A plan is unrealistic when it calls for skills, materials, funds, numbers of staff or amounts of imported supplies and equipment which are beyond the possibility of the park service or the government.

The OUTPUTS are compared to the INPUTS. Can the expected outputs be produced by working with the inputs? Is nothing else needed? Are there too many inputs for what is necessary? It is necessary to run a cross-check on the internal consistency of the plan: Too many inputs may imply future waste; too few may mean that fewer outputs will, in fact, be realized. Perhaps the outputs are too ambitious and require more inputs than are to be available; or, alternatively, the outputs may be modest, and the same number of available inputs could yield greater outputs than the plan anticipates.

Finally, the alternative must be accepted or rejected. The proposed management and development programs may require some small adjustments in one section or another to be acceptable. Once rectified, the proposal may be accepted as THE PLAN. On the other hand, this proposal may have fundamental problems involving the zoning, the management concepts or the development program. The objectives may be the cause for rejection: once they are transposed into activities, the kind of action required may be found to be unacceptable.

A rejection means that the planning team must reassess the proposal from top to bottom. It is generally not a case of small corrections, but the need to re-think the objectives, the zoning, the management concept and development program. A whole new solution may evolve.

The analysis and evaluation aspect of planning should be a constant concern of the planners and should be a part of all planning steps. However, following the drafting of the integrated development program, the moment is appropriate to pause and reflect. It is a time to examine the proposal from as many points of view as possible. The preparation of scale models, such as that shown in Figure III-12, may be useful to focus the ideas more clearly.

Establishing Priorities for Implementation

One key question on planning remains: Where are the various activities to be implemented? All things cannot be done at one time. The entire park cannot be developed in one fiscal year. If not, then which activities should be implemented this year, which next year, and what can wait 5 or 10 years? It is difficult to predict the various demands to be placed upon the park by recreationists, teachers, students and scientists. The prices of construction in future years are uncertain. Public and government attitudes on conservation are changing. On the other side, budget and personnel will always be scarce in relation to the demands placed on them by numerous project proposals through all branches of government. As such, it will be virtually impossible to invest in all aspects of the park plan during one or even a few fiscal years.

It is necessary to carefully select those aspects of the development program which are most urgent and important to the success of the park. These items can be spread over time in a logical manner.

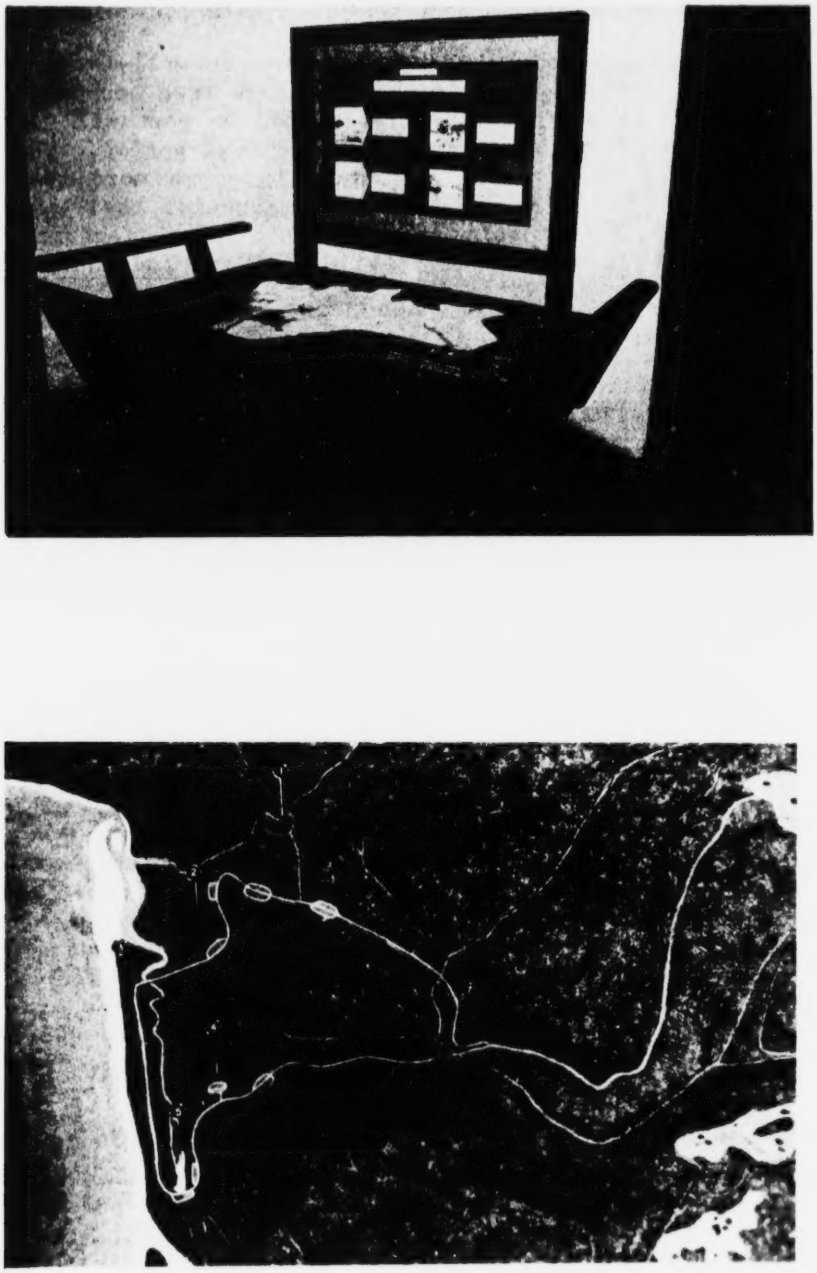


Figure III-12. A scale model of the proposal for Santa Rosa National Park aided in the scrutiny and discussion of the plan.

During each successive budgetary period it will be necessary to analyze and evaluate the activities which have been accomplished during the period which is ending. This review of the past will develop the basis for more accurate predictions for the next period. The plans for the activities of each fiscal period will become more reasonable. Developments can be implemented on an incremental basis which will provide the basis for learning about such critical factors as human behavior, the impact of tourism on wildlife, and the most appropriate design for different facilities.

A DEVELOPMENT SCHEDULE is prepared which establishes the priorities for implementing all management and development activities in a logical order over time. Among the many factors which influence the schedule, eight can be considered as most influential:

1) Expectations of the demand for each service
2) Ecological constraints
3) Urgency considerations
4) Engineering constraints
5) Budgetary expectations
6) Availability of personnel
7) Institutional constraints
8) Political and social considerations.

The first four variables are technical and relatively objective in nature. The planners can deal with them in practical terms. The second four factors are institutional and political in nature, and relate to strategic questions. In many cases the latter four factors will in fact be examined first, and perhaps the political and social considerations will set the stage for the analysis of the other factors. However, the view here is that the planning team is to offer technical alternatives to the managers and decision makers who must interpret and deal with the institutional and political aspects of the problem.

In the early stages of developing a park service and national parks, park service directors often personally serve as members of planning teams. Because of this, all eight factors are usefully considered together in the same exercise.

In subsequent stages, of institutional evaluation where a park service has evolved into a complex organization with several operating parks, typically, the directors will specialize in strategic considerations. Park planning teams will confine their focus to park units within policy guidelines given to them by the directors. In this case, the first four factors are treated in the development sequence of each individual park plan, and the latter are integrated into strategy planning for the entire park system.

Expectations of the demand for each type of service are stated. Some services will be new and available for the first time in the nation. Although demand already exists for many services, data may not have been collected and analysis and prediction may be difficult. Furthermore, the wishes of the population are rapidly evolving.

Certain assumptions can be made, however, with relative certainty:

a) The aspirations of the people, and most government plans, involve increased levels of human welfare including opportunities for healthy forms of recreation;

b) The development of nationally appropriate technologies is to be favored over imported alternatives;

c) The protection of symbols of national and cultural heritage, and the inherent wealth of resources, is near-universal aspiration;

d) Most nations aspire to educate and promote appreciation of the national heritage;

e) Water and soil are to be conserved;

f) Tourism is favored in most countries based upon policies of open relations with the world community and of promoting foreign exchange earnings;

g) To the extent that scientific efforts support national development and the above aspirations, national efforts shall be strengthened.

Thus, it is likely that the demand for the kinds of services which can come from national parks will grow. What is unclear is the relative mix of services: for example, how much recreation versus how much research? People may come to visit a newly opened park in waves and overrun the installations as was the case in 1973 in the Aguas Calientes Recreation Area of Puyehue National Park, Chile, when over 1,000 recreationists per weekend day visited the new area during the warm summer months.[10] Similarly, the research facilities of Santa Rosa National Park, Costa Rica, were heavily occupied from 1973 onward following their completion and an additional biological station with a capacity for 30 researchers was programmed for construction in 1977.[11] Other recreation and research facilities may remain under-utilized, perhaps because of their isolation, design or setting. The question is one of efficiency in the use of public resources: Recreation areas which go under-utilized represent a sub-optimum investment. Areas which are over-utilized relative to the supply of services which have been developed represent a foregone opportunity to give public service, and the natural resource of such areas may face deterioration because services are lacking. The same applies for research, education and other services.

Ecological information and guidelines must support the implementation of each activity. The lack of ecological understanding about a particular area may require a delay in all development until habitats, migratory routes, nesting sites, sub-soil water movements or other factors have been studied. Ecological understanding lends or detracts confidence from scheduling decisions. If understanding is high, confidence will be high, and development can proceed. But, if there are doubts as to the advisability of a proposed management or development activity, the implementation of such items must be delayed for future years. Alternatively, rather than delay the implementation of development activities, the researchers can be provided increased funds to speed up their work and more quickly support the managers with greater understanding of the problem.

Ecological researchers must be given the opportunity to study areas of a park before development is initiated. However, ecologists must be ready, willing and able to do the necessary research within reasonable time periods. It would be absurd that because of the lack of cooperation of ecologists or the impatience of the managers, a little known area in a national park is developed with the risk of destroying natural values before their existence was even verified.

It is particularly difficult to make a simple rule or guideline concerning the question of ecological confidence. The case of genetic resources is especially illustrative of this problem: Of the 10 million or so species on Earth, some 40% live in the American humid tropics.[12] Well over half of these plants and animals have yet to be named by science. The medicines and foods which have been and will continue to be developed from wild species affect the lives of every citizen in Latin America. How anxious to develop parks can managers afford to be? The throttle on the bulldozer may also be the handle on a guillotine for species which are key to human welfare.

Each activity to be developed has a particular degree of urgency. For example, perhaps the southern sector of the park is being occupied by migrant agriculturalists (squatters), and as such, that boundary must be marked and patrolled before a valuable relic forest is converted into pasture. Recreationists may already be using an area where there are no sanitation facilities. The site for employee housing may be in line with a deer migration route and research is needed quickly.

Commonly, the manager faces the urgent need to make political impact in order to try and obtain support of government and the general public for the park program. This effort may require the early implementation of recreation, education or scientific activities. In other cases, there may be an urgent need to convince other public agencies to harmonize their proposals or to collaborate with that of the park. For example, Agrarian Reform may wish to colonize an area in the park, a powerline may be programmed to cross the park, or the tourism corporation may wish to develop intensive tourism facilities in the heart of the scientific zone of the park.[13] The immediate expenditure of funds to win these battles may be more important to the success of the park than investments in traditional park development.

Furthermore, there are technical principles, practices and methods related to engineering and architecture which limit the way in which roads, buildings and other facilities can be constructed and maintained. It is very inefficient to load, transport and unload heavy equipment to and within the park each summer or dry season just to build short sections of road or small additions to buildings. Building materials can be purchased at lower prices when ordering large quantities, but proper storage facilities must be available. The personnel required to construct roads and buildings need housing. The machines need maintenance shops. Water cannot be supplied until a source is found and lines connected.

Engineering and architectural constraints have their origins in the order and sequence in which construction takes place. They are complimented by the linkages to maintenance, manpower and energy requirements. These are technical guidelines irrespective of costs.

The technical guidelines are generally free of political and institutional considerations. By following these four guides, a development sequence can be prepared which will be logical and sequential.

As already noted, park planning teams in developing countries often include the director and other senior officers of the park service. The team also may include officers from the national or regional planning board, other public institutions and universities. In this way, it is not only difficult to remove political and institutional considerations from the discussions on implementation, but it is also an opportunity to weave the realities of the nation into the park plan.

Budgetary expectations establish both the scale and the rate of growth of the park. In scale, the ultimate total cost of parks may be on the order of hospitals, schools and sanitation projects. Where parks are in fact planned as integral elements of ecodevelopment, they require similar budgetary status to other major public efforts.

The rate at which investments are made in national parks, however, will depend upon other national priorities. Surely, urgencies for food, employment, housing, health and education warrant the major share of available funds. Recalling that these investments are interdependent with park management, a minimum rate of investment in parks is necessary right from the start. It is not a question of delaying expenditures in parks until the "more urgent needs" are met, but rather including minimum investments in parks as part of the "more urgent needs."

Early expenditures in parks may go for the identification, establishment and protection of areas capable of meeting objectives for ecodevelopment. Subsequent funds may provide for recreation, tourism, research, monitoring and the like. Thus, the establishment and basic management of parks is not to be traded or subordinated to critical social demands but interwoven with them. The development of specific services will vary from country to country, and park to park, depending upon rate at which society can afford to invest in them as part of overall national development.

Past experience, current trends and expectations for the future will support estimates for the park budgets. The budget for parks will either remain the same as in the past, it will increase, or it will decline. Some items like hydroelectric dam construction will be planned years in advance. Parks may be held static or even slightly cut for five years because of such a project. Conversely, natural disasters like earthquakes, volcanic eruptions, floods or droughts, are sudden and unforeseeable. When they occur, the budgets of all government departments may be reassigned immediately.

In the simple case where only one park is being developed at a time, the rate of growth must be adjusted to be consistent with the expected budget. Where several parks are being developed simultaneously, the park service budget will be divided among the several projects. The heavy capital investments in land, roads and buildings may have to be programmed over several years to leave sufficient funds each year for less expensive but no less important items such as interpretive exhibits and staff training.

A newly-developing park will normally require newly employed personnel, or the transfer of individuals from other on-going parks. This requires recruitment, training efforts, facilities, scholarships and perhaps even a study tour abroad. A well-phased program will contemplate the time necessary to recruit, train or transfer a new park director, biologist, rangers, research ecologist, or maintenance engineer.

The park service itself has internal constraints of an institutional nature. the service must be able to absorb the administration of a new park and all that is involved with park management and development. Additional decisions will need to be made: purchasing, inventory control, personnel management, finance and record keeping must all be expanded or redistributed within the given structure.

Finally, the political and social climate must be weighed. This guideline has as its purpose the careful analysis of the political and social context within which the park is to be developed. It is not a question of playing politics with parks, but of sizing up the wind before setting sail. For example, current climate may favor popular recreation. Thus, the park can expect support for placing recreation facilities in the early phases of the development schedule. A strong commitment to scientific cooperation on environmental research may place relatively early emphasis on the construction of research facilities and the preparation of institutional agreements.

When the development schedule is being designed, the political and social climate ought not to alter *what* is to be constructed, but only affect *when* each activity is to be implemented. The interpretation of political and social climate or the use of policy guidelines are in no way to be confused with politics and political influences in short-run duration. Parks are elements of the nation's social capital to be built and maintained over long periods of time.

These eight variables are interrelated and interdependent. In practical planning they should be considered one by one in the suggested order. No single factor is dominant. Each is important. Each acts to temper the others. For example, there may be an urgent need to develop recreation facilities in a given park, but the ecologists' studies of the zone appear to require several years; the ecologists may advise that the park remain undeveloped for several years, yet the only way by which the park will be given sufficient budgetary support to cover adequate protection may be to quickly offer popular recreation services!

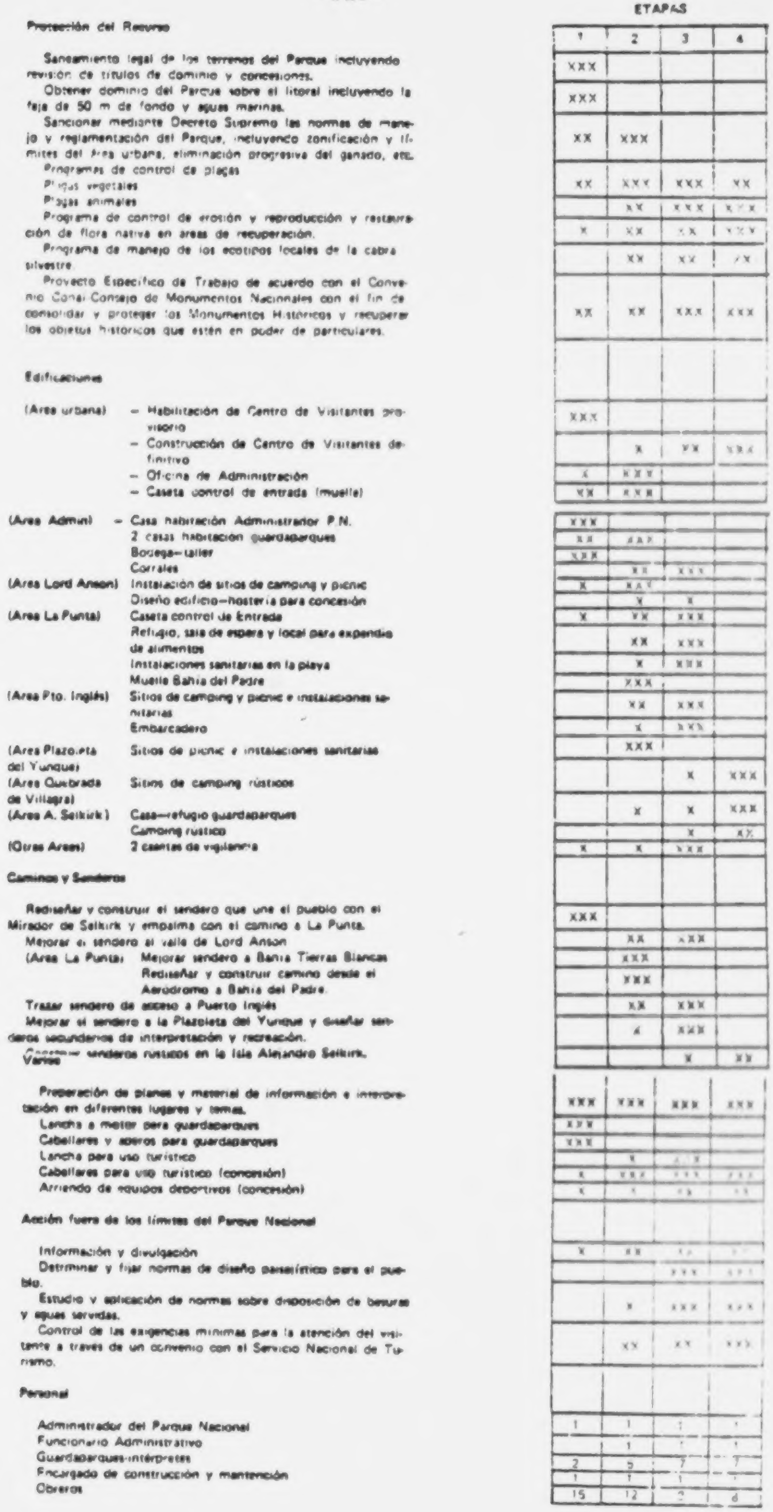
The interrelatedness and interdependence also correspond to the development of two or more parks simultaneously. In those parks which have difficult access and are distant from urban centers, early emphasis may favor the development of protection, basic knowledge and research. More accessible areas may need to contemplate investments in recreation and education more quickly.

The 1968 proposal for the Santa Rosa National Park, Costa Rica, included a detailed development schedule in tabular, graphic, and textual form.[14] The interested reader is urged to study these materials in Appendix III-B, C and D. Emphasis should be given to the relationship between the three forms of presentation and to the logic and expression utilized in the textual form.

Experience has shown that less-complex development schedules are more useful. In Figure III-13, the schedule for the Galapagos Islands National Park is shown. Note that emphasis is placed upon the order of activities. There is no specific reference to fiscal years since the rate at which the park develops depends upon factors beyond the control of park planners and managers.

Finally, priorities may be established for the activities of individual management programs. In the case of Tayrona National Park, Colombia, the planners and managers found insufficient knowledge upon which to base decisions for implementing major elements of the development program for the marine resources. The schedule for the corresponding research program is shown in Figure III-14.

The development schedule is a brief simple statement of priorities for implementation. It can include construction of physical facilities, personnel development activities and items requiring legal, policy and administrative action. In the final analysis, the schedule is a tool which communicates the entire management and development plan to decision makers and budget officers. The funding of a park may ultimately depend upon the clarity and logic with which the schedule is presented.



	ETAPAS 1	2	3	4
Protección del Recurso				
Saneamiento legal de los terrenos del Parque incluyendo revisión de títulos de dominio y concesiones.	XXX			
Obtener dominio del Parque sobre el litoral incluyendo la faja de 50 m de fondo y aguas marinas.	XXX			
Sancionar mediante Decreto Supremo las normas de manejo y reglamentación del Parque, incluyendo zonificación y límites del Área urbana, eliminación progresiva del ganado, etc.	XX	XXX		
Programas de control de plagas				
Plagas vegetales	XX	XXX	XXX	XX
Plagas animales		XX	XXX	XXX
Programa de control de erosión y reproducción y restauración de flora nativa en áreas de recuperación.	X	XX	XX	XXX
Programa de manejo de los ecotipos locales de la cabra silvestre		XX	XX	XX
Proyecto Específico de Trabajo de acuerdo con el Convenio Conaf-Consejo de Monumentos Nacionales con el fin de consolidar y proteger los Monumentos Históricos y recuperar los objetos históricos que estén en poder de particulares.	XX	XX	XXX	XXX
Edificaciones				
(Área urbana) – Habilitación de Centro de Visitantes provisorio	XXX			
– Construcción de Centro de Visitantes definitivo		X	XX	XXX
– Oficina de Administración	X	XXX		
– Caseta control de entrada (muelle)	XX	XXX		
(Área Admin) – Casa habitación Administrador P.N.	XXX			
2 casas habitación guardaparques	XX	XXX		
Bodega–taller	XXX			
Corrales		XX	XXX	
(Área Lord Anson) Instalación de sitios de camping y picnic	X	XXX		
Diseño edificio–hostería para concesión		X	X	
(Área La Punta) Caseta control de Entrada	X	XX	XXX	
Refugio, sala de espera y local para expendio de alimentos		XX	XXX	
Instalaciones sanitarias en la playa		X	XXX	
Muelle Bahía del Padre		XXX		
(Área Pto. Inglés) Sitios de camping y picnic e instalaciones sanitarias		XX	XXX	
Embarcadero		X	XXX	
(Área Plazoleta del Yunque) Sitios de picnic e instalaciones sanitarias		XXX		
(Área Quebrada de Villagra) Sitios de camping rústicos			X	XXX
(Área A. Selkirk) Casa–refugio guardaparques		X	X	XXX
Camping rustico			X	XX
(Otras Áreas) 2 casetas de vigilancia	X	X	XXX	
Caminos y Senderos				
Rediseñar y construir el sendero que une el pueblo con el Mirador de Selkirk y empalma con el camino a La Punta.	XXX			
Mejorar el sendero al valle de Lord Anson		XX	XXX	
(Área La Punta) Mejorar sendero a Bahía Tierras Blancas		XXX		
Rediseñar y construir camino desde el Aeródromo a Bahía del Padre.		XXX		
Trazar sendero de acceso a Puerto Inglés		XX	XXX	
Mejorar el sendero a la Plazoleta del Yunque y diseñar senderos secundarios de interpretación y recreación.		X	XXX	
Construir senderos rústicos en la Isla Alejandro Selkirk.			X	XX
Varios				
Preparación de planes y material de información e interpretación en diferentes lugares y temas.	XXX	XXX	XXX	XXX
Lancha a motor para guardaparques	XXX			
Caballares y aperos para guardaparques	XXX			
Lancha para uso turístico		X	XX	
Caballares para uso turístico (concesión)	X	XXX	XXX	XXX
Arriendo de equipos deportivos (concesión)	X	X	XX	XX
Acción fuera de los límites del Parque Nacional				
Información y divulgación	X	XX	XX	XX
Detrminar y fijar normas de diseño paisajístico para el pueblo.			XXX	XXX
Estudio y aplicación de normas sobre disposición de basuras y aguas servidas.		X	XXX	XXX
Control de las exigencias mínimas para la atención del visitante a través de un convenio con el Servicio Nacional de Turismo.		XX	XX	XXX
Personal				
Administrador del Parque Nacional	1	1	1	1
Funcionario Administrativo		1	1	1
Guardaparques-intérpretes	2	5	7	7
Encargado de construcción y mantención	1	1	1	1
Obreros	15	12	[illegible]	6

Figure III-13. The development schedule for the Galapagos Islands National Park, Ecuador, illustrates a typical expression of priorities for the implementation of a park plan.

Figure III-14. The proposed research plan for marine resources in Tayrona National Park, Colombia, illustrates the priorities for implementation of research activities to support the management and development plan for the park.

Cuadro 3. PROGRAMA TENTATIVO DE INVESTIGACIONES DE BIOLOGIA MARINA Y DE LAS INVERSIONES NECESARIAS PARA EL PARQUE NACIONAL TAYRONA

AÑO	PROYECTO	RESULTADO ESPERADO	EQUIPO	COSTO	TOTAL Y AÑ
I	a) Zonificación de Ecosistemas (ensenada de Gayraca) b) Identificaciones, inventarios de los corales presentes en la Ensenada de Gayraca. Inicio de su Zonificación. c) Inicio estudios para acuarios. d) Organización del museo científico	Mapa de zonificación de los ecosistemas. Posiblemente su distribución en profundidades (perfiles). Colección de especímenes para museo público. Inicio museo científico que servirá de base para el museo público. Bases para conservación de especies comerciales o de su incremento.	Botellas Nansen y termometros reversibles .... Balsa .... Equipo químico y análisis Equipo de buceo .... Equipo de almacenamiento. Papelería museo .... Mapas .... Microscopio .... Equipo de disección ..... Equipo de dibujo .... Anaqueles, etc. .... Vidriería	40.000.oo 40.000.oo 15.000.oo 50.000.oo 5.000.oo 5.000.oo 5.000.oo 100.000.oo 2.000.oo 10.000.oo 70.000.oo 5.000.oo	3347.000.oo
II	a) Continuación de identificación, inventario y zonificación de corales de la Ensenada de Gayraca. Iniciación inventario (o continuación) de zonificación de otras especies. b) Iniciación zonificación ecosistemas en Chengue. Iniciación de identificación, inventario y zonificación de corales. c) Inicio de estudios de otros ecosistemas en Gayraca.	Mapa de zonificación de ecosistema (con profundidades) de Chengue. Lista y mapa de zonificación de corales en Gayraca. Colección de especímenes para museos público y científico, tanto de corales como de otras especies. Inicio museo público.	Embarcación .... Bote con fuera de borda . Equipo químico y análisis Equipo de buceo .... Equipo almacenamiento ... Vidriería .... Papelería museos y otros.	250.000.oo 40.000.oo 15.000.oo 20.000.oo 5.000.oo 5.000.oo 5.000.oo	3340.000.oo
III	a) Continuación identificación, inventario y zonificación corales de Chengue. b) Continuación de estudios otros ecosistemas en Gayraca. c) Continuación clasificación otros animales. d) Continuación de la distribución y leyendas para el museo público.	Lista parcial de zonificación y de corales de Chengue. Colección de especímenes para museo público y científico. Clasificación parcial de peces en Gayraca y Chengue. Inicio del estudio sobre peces estables y peces migratorios. Epocas de emigración. Inicio mapa sobre zonificación de peces en los corales.	Equipo químico y análisis Equipo de buceo .... Equipo almacenamiento ... Vidriería .... Redes de arrastre y plancton .... Redes de media agua y trasmayos .... Papelería museo, otros .. Mapas. .... Winches y cables	15.000.oo 20.000.oo 5.000.oo 5.000.oo 25.000.oo 5.000.oo 1.000.oo 150.000.oo	3251.000 oo
IV	a) Inicio zonificación de ecosistemas en la ensenada de Neguange. b) Inicio estudio sobre zonificación de corales en Neguange. c) Continuación de trabajos en museos públicos y científicos. d) Continuación de estudios de peces en las ensenadas y su zonificación. e) Inicio (o continuación) de estudios de otras especies y su zonificación.	Mapa de ecosistemas Neguangel. Continuación de recolección y clasificación de especímenes para los museos. Resultados parciales de estudio sobre salinidades y temperatura. Resultados parciales sobre épocas de desove de peces e invertebrados; a ser posible sus relaciones con la temperatura. Estudio comparativo de zonificación de corales de las áreas estudiadas. Continuación de estudios sobre ecología de peces. Inicio de resultados sobre autoecología de algunos peces.	Equipo de buceo .... Equipo químicos y análisis .... Vidriería .... Redes de arrastre y plancton .... Equipo fotográfico ...... Papelería .... Mapas	15.000.oo 15.000.oo 5.000.oo 15.000.oo 30.000.oo 5.000.oo 5.000.oo	90.000 oo
				Total	1028.000.oo

Nota: Este costo no incluye personal.

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APPENDIX III-A

METHODS FOR GATHERING FIELD INFORMATION IN RELATIVELY KNOWN AND RELATIVELY UNKNOWN AREAS

Field Methods in Relatively Unknown Areas

In relatively unknown geographic areas the key problem facing planners is the difficulty of obtaining a rapid easy insight into the status of the resources. Wherever available, stereo pairs of aerial photographs and a stereoscope enable planners to analyze vegetation, geology, river patterns, existing roads and settlements, and the margins of cultivated lands penetrating into the wild area. However, where this valuable tool is not available, the team will have to gather observations along transects which, similar to aerial photography, are oriented either (a) along a predetermined grid often designed in conjunction with statistical sampling techniques, or (b) according to the landscape and topography. The transects are either run using light aircraft or on the ground, or both.

An example is presented which will demonstrate the method employed by the first park planning team to study Canaima National Park, Venezuela.[15] The team entered the area in July 1962 at a time when aerial photographs were not available for that sector of the country. Maps were either large in scale or were hand sketched by previous expeditioners.

Canaima had been declared a National Park in June of that year with an area of one-million ha. There had been no previously written plan prior to the establishment of the park. While the area was little explored, it was well recognized around the world as the site of Angel Falls, claimed to be the world's highest at 1,000 m (3,212 feet). News media spread many reports of the 1937 crash of Jimmy Angel's aircraft on top of Auyan-tepui mesa. The Falls bear his name. Scientific expeditions were subsequently drawn to the area due in part to the publicity which Angel and the rescue expedition created. Portions of the surrounding area and on top of the mesa were described in scientific journals. Analysis disclosed how Auyan-tepui made up part of the Guiana Shield formation and emphasized the high rate of plant and animal endemism found on the tepius.[16]

By 1962 the northern sector of the Park was already receiving several hundred tourists at the Avensa Airlines camp at Canaima and through the more rustic adventurous canoe and foot tours organized by Rudy Trefino from his base camp upstream from Canaima. Trefino also guided and offered logistical support to scientific expeditions. Missionaries had established missions in the valleys to the south and southeast of Auyan-tepui. Prospectors penetrated the area in search of gold, diamonds, iron and related ores. The Missionaries estimated that approximately 900 indigenous peoples of the Kamarakoto and Taurepanes tribes were living in the area to be included in the newly created Park.

The office work for the Canaima planning exercise was carried out with the cooperation of the National Parks Division of the Ministry of Agriculture and Livestock in Caracas, the Guayana Corporation (CVC) in Caracas and Cuidad Guayana, and the Orinoco Mining Company in Puerto Ordaz. In addition to consulting the officers of these organizations, and the scientific literature, questions were always asked in relation to the terrain, local availability of vegetable and animal foods to support the expedition, and the availability of local cooperation in logistical matters. It was clear that all food would have to be carried into the area for a minimum period of 30 days, maximum of 55 days, and that approximately 300 kilometers would have to be covered on foot (round trip). Due to altitude, rain and the absence in the area (again, in 1962) of support equipment such as helicopters and portable radios, there would be no logical back-stopping once the team entered the area.

Special back-packs and equipment were designed and constructed to meet the specifications of the journey: There would be considerable rain and fog, many areas of flat open rock without tree or soil cover, and exposed rock climbing to be done. Also, navigational aids would be required. Prior to arriving the field the team members not only prepared themselves physically for a long and difficult field experience, but they also practiced rope climbing, navigation and mapping techniques. A BASE MAP was made from the available information and each team member carried a copy.

The team arrived at the Mission of Camarata with all equipment and food supplies on June 28, 1962. Local guides were employed and the expedition entered the heart of the study area.

The basic model for the field work can be summarized in five steps:

1) Get a birds-eye view of the terrain and look for possible routes for running transect lines. On the final portion of the flight into the Camarata base camp, the DC-3 flew systematically across the area as clouds and winds permitted. The team members sketched onto their BASE MAP information on streams, cliffs, and easy-to-spot land marks to aid in later ground navigation. The team and the pilot searched for routes for foot travel along the rugged terrain which appeared to represent the least obstacles yet facilitate the greatest field of vision of surrounding terrain.

2) Run the team along a transect (series of connected straight lines) which can be repeated and re-checked so the planners can return and intensify their information or cross-check previously gathered information.

3) Gather information along the transect, on an integral basis (plants, animals, rocks, etc.) and mark collection sites on BASE MAP.

4) Divide the area along either side of the transect into homogeneous or TYPE UNITS which are easily recognizable from the air, ground and photographs. Plot type units on BASE MAP.

5) Extrapolate from known points along the transect to distant areas. Run spur lines from base line out to cliffs and peaks which permit an overview of areas parallel and distant from the transect.

As noted in Figure III-A-1, the team moved along a BASE LINE TRANSECT. All camps and special readings were noted on the BASE MAP. Bearings and approximate distances were noted in a field notebook. Pocket compasses and clinometers were used along with foot pacing to triangulate direction, distance and elevation. The trail was marked without causing undue damage to the vegetation, and daily rations of food and the exposed film (in plastic bags containing silica-gel) were cached at carefully noted sites to be gathered on the return trip.

Samples were collected and marked with numbers to indicate points along the base line transect, and again, notes were made in the field notebooks and on the BASE MAP. By establishing a common system for note-taking and for annotating specific sites, each team member was free to make his own observations and collect his own particular notes which could later be collated and discussed in the evening camp and in subsequent office analysis.

The auyan-tepui area was subdivided into six types: Forest, Igneous, Scrub, Quartzite-Sandstone Scrub, Savanna, Gallery Forest, and Crevase Scrub. Each type was easily recognizable by each member of the team. Where possible, many annotations were made concerning geology, vegetation, animal sightings, weather, topography, and outstanding opportunities or problems for park management and development. But the TYPES shown in Figure III-A-1, formed the underlying matrix to permit the team to project and extrapolate their information from along the transect to distant sectors observed from overviews and cliffs.

In addition to the information which was recorded on natural formations, objects and phenomena, notes were made on drainage, fresh water supplies, potential access routes, scenic beauty, scientific value and unique environments.

In an effort to gather information in the most meaningful way possible, specific points were chosen by team members to represent each TYPE AREA. From these points, a 360-degree panoramic photograph was taken to record the terrain.

In addition to the TYPES shown on the BASE MAP, the team calculated or estimated a PROFILE for the transect as shown in Figure III-A-2. The horizontal scale on the PROFILE is the same as the scale on the BASE MAP to allow for graphic comparability. The verticle scale in the PROFILE is exaggerated by two or three to reflect the prominent topographic features.

Additional maps were prepared in the field for those areas which because of their significance were under consideration for particular

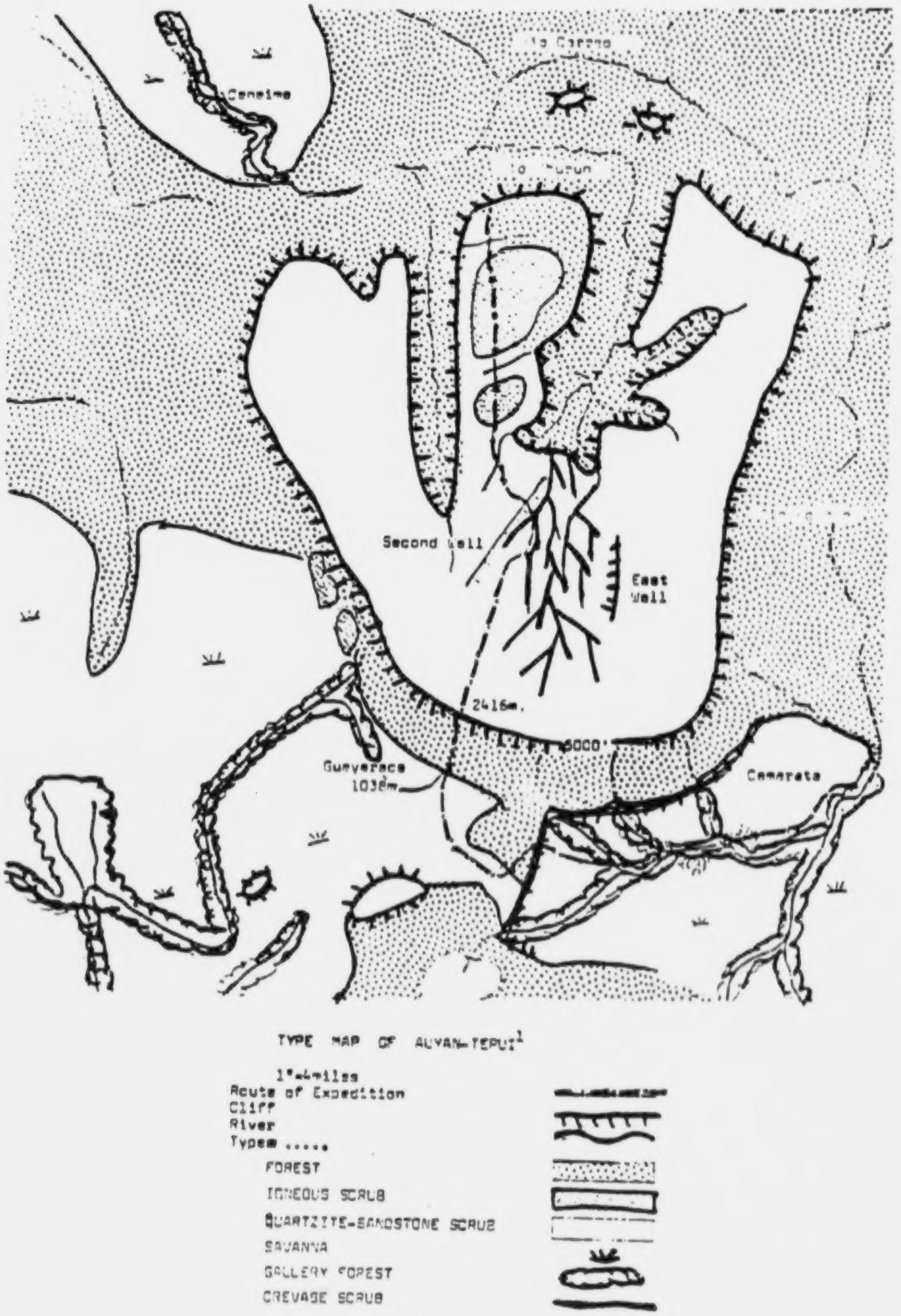


Figure III-A-1. BASE MAP from the Denney-Miller Expedition to Canaima, Venezuela in 1962. Note the route of the expedition, the zoning for inventory purposes, and the relationship between this figure and III-A-2.

Source: Miller, K. R. A Proposed Plan for the Development of Canaima National Park, Venezuela. MSF Thesis, University of Washington, Seattle, USA. 1962. p. 59.

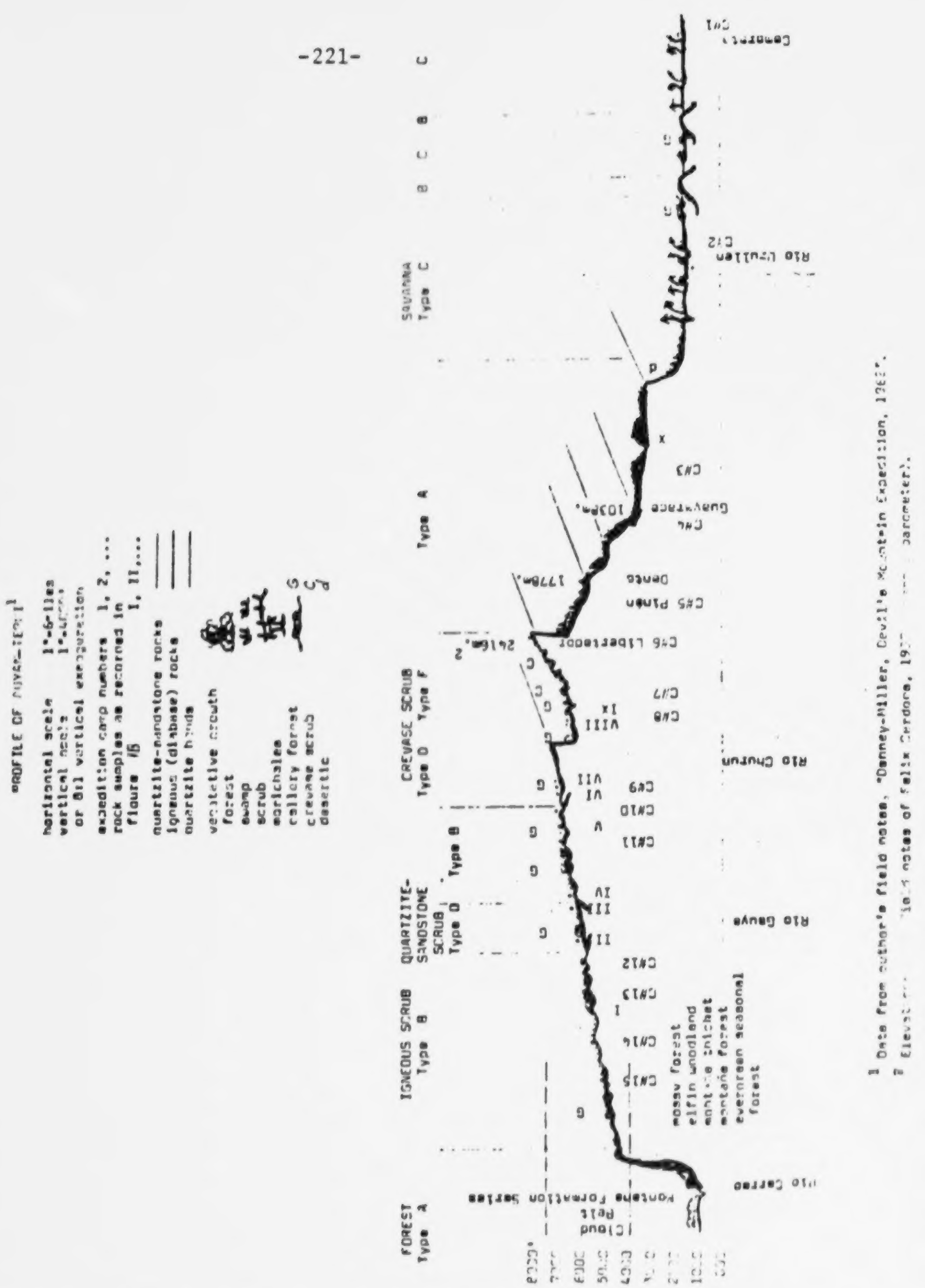


Figure III-A-2. PROFILE of the BASE LINE from the Denney-Miller Expedition to Canaima, Venezuela in 1962. Note the recording of information on type zones, camp sites, ecological zonation in relation to elevation, and rock sample numbers.

Source: Miller, K. R. A Proposed Plan for the Development of Canaima National Park, Venezuela. MSF Thesis, University of Washington, Seattle, U.S.A. 1962. p. 60

uses and developments. During the initial phase of field work it was considered sufficient to sketch the topography and landscape based upon reference lines and elevation points extended from the base line. While the error in altitude above mean sea level was unknown, and the exact horizontal coordinates of particular points could not be precise, this relative impression of the site greatly aided in supporting subsequent planning decisions. Photographs were particularly useful when the points and angles from which the photographs were taken are noted on the maps.

Figure III-A-3 illustrates a field SKETCH MAP which was drawn by ocular estimations tied together by compass, clinometer and estimates of distance. The SKETCH MAP was tied to the BASE MAP by readings along spur transects run from the BASE LINE TRANSECT. While it was a visual impression containing errors of unknown magnitude, it represented the best information available. On the SKETCH MAP, slope, ground cover, topography, outstanding features and other characteristics were recorded for subsequent use in planning and management.

Throughout the field exercise the team observed the terrain for sites which were significant to planning because they were undergoing accelerated natural or man-caused erosion, the stream banks were subject to periodic inundation, the lands were slow to drain, and because of other natural phenomena which may have an influence on the management and development of the area. These CRITICAL AREAS were marked on the BASE MAP and described in the margin of the map and in the field notes.

With this basic information in systematic form, the team is ready to move on to subsequent steps in the planning process. It is important, however, to recall an earlier principle. Each day in the interior of the study area represents the work of weeks or months in preparation, conditioning, personal sacrifice and expenditures. Once the team leaves the field, disassembles the expedition and returns to other tasks, it will be very expensive to return to the area.

Finally, to minimize the number of visits required to little-known study areas, it is essential to stress the need for the team to seek out individuals with particular information and experience. Most often there will have been surveyors who crossed the area to establish national and provincial boundaries. There will have been prospectors searching for minerals or timber. And there will have been scientists who searched for new species, natural phenomena and medicinal sources. There will have been archeologists and anthropologists studying native peoples. Missionaries will have navigated streams to establish and carry logistical support to interior missions. All of these individuals can offer valuable information. The Auyan-tepui Expedition of 1962 found important information from Capuchin Missionaries, several local Indians who had guided (or who's fathers had guided) earlier expeditions into nearby areas, and from prospector Alejandro Laime.

In Caracas, William Phelps, Jr., who had been a member and sponsor of the 1937 expedition to search for Jimmy Angel's plane, and later to carry out scientific work on the mesa, helped the team locate Felix Cardona who had crossed the savanna valleys along the base of

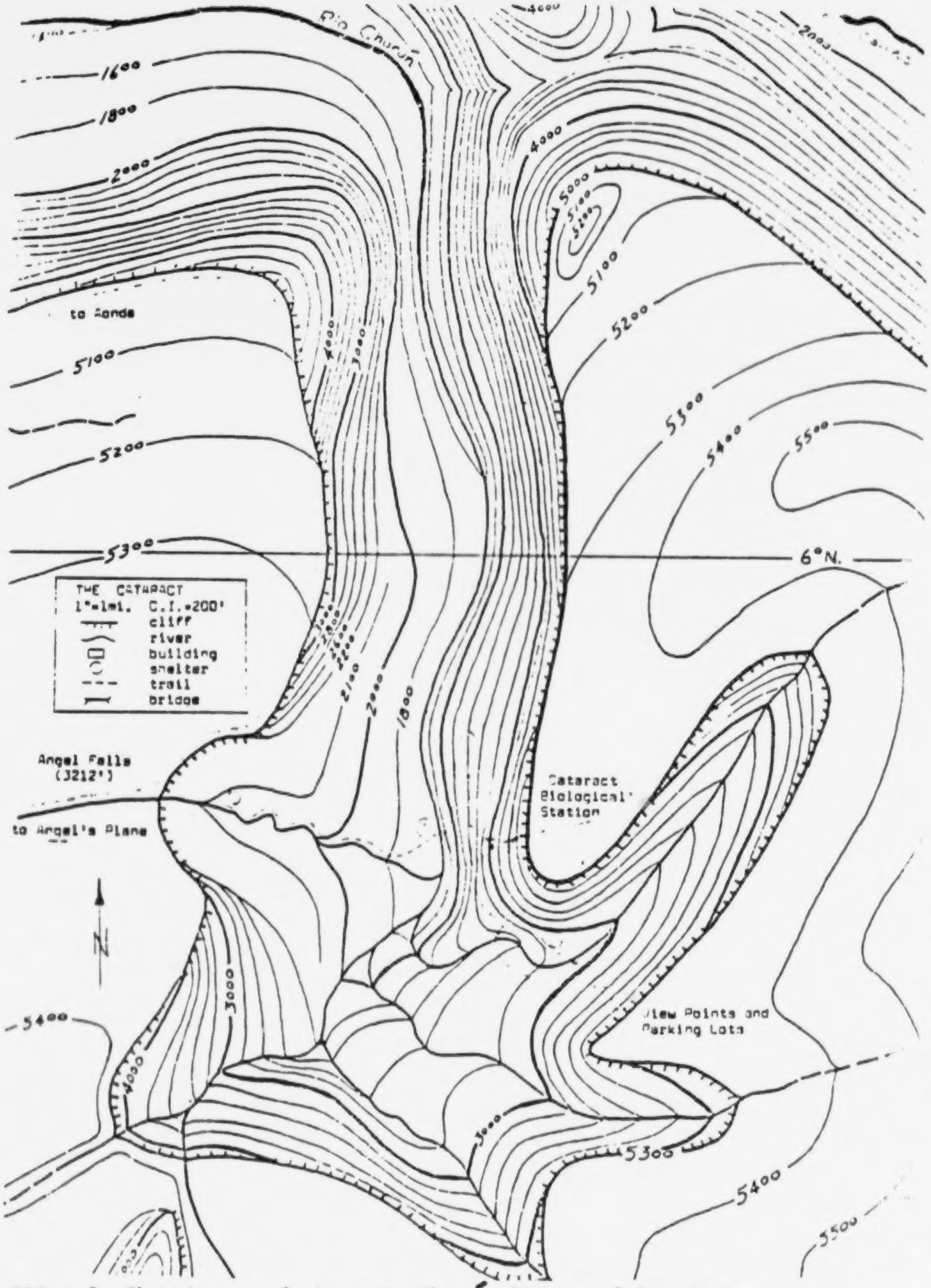


Figure III-A-3. Sketch map of the main Churún Canyon of Canaima National Park, Venezuela, into which tumbles Angel Falls (1000 m). Prepared by the Denney-Miller Expedition, 1962.

Source: Miller, K. R. A Proposed Plan for the Development of Canaima National Park, Venezuela. MSF Thesis, University of Washington, Seattle, U.S.A. 1962. p. 109.

Auyan-tepui in 1928 enroute to the south where he surveyed the boundary between Venezuela and Brazil. Cardona claimed to have climbed Auyan-tepui in 1928, long before other explorers had come to the area, and his photograph album and field notes attested to the factual nature of his information. Cardona also assisted in drawing comparisons between the status of vegetation, animal populations and the indigenous cultures and their land use activities in 1928 and 1939, and then to 1962.

Field Methods in Relatively Known Areas

Known areas are those considered to be covered by aerial photographs, topographic maps and some level of geological, botanical and zoological surveys, or other basic inventories. These areas generally have existing logistical systems including transportation on a regular or periodic (arrangeable) basis, nearby villages, hotels and communications. Furthermore, these areas have generally been visited by members of the park organization and by local university professors and scientists. And often, they already have some sort of established park structure including a ranger staff, roads or trails, communications, and some management activities. There is often some level of recreation, tourism and cooperative research, and the ecosystem is already receiving some level of protection.

The planning team is not moving into the exercise in relative ignorance. Lines are already drawn on the park map, so to speak. Commitments have been made already: roads and buildings built, men employed and tasks assigned, communications cables strung, visitor activities organized, recreation sites constructed and advertised, and research activities underway.

There may have been a previously prepared written management document during earlier stages of the park's establishment which was based upon an inventory. Such earlier documents will have been studied for guidelines which may assist in preparing a new more intensive inventory.

An example of this type of planning context can be drawn from the experience of the Galapagos Islands National Park in Ecuador during 1973.[17] The National Park was created in 1934. Activities in the Park began with the establishment of the Charles Darwin Research Station in 1959 with the objective to support research and lay the basis for the management and development of the Park.

By 1973, the Ecuadorian Park Department and the Darwin Station were in possession of sufficient information to support an advanced and relatively detailed planning exercise for the Park. A planning team was formed by the Ecuadorian Forest Service with the technical and logistical support of the Darwin Station and its UNESCO sponsored Director and with the technical cooperation of the National FAO Forestry Project and the FAO Regional Wildland Management Project.

A principle which differentiates known from unknown areas was immediately evident in the Galapagos planning exercise as it contrasts to the 1962 Canaima exercise: The Galapagos Islands could be discussed and analyzed in ABSTRACTION. First, most of the members of the team had previous experience in the Islands; second, through the very extensive literature of the Darwin Station and by contact with the rangers and the scientists, the team could compare the characteristics of particular sites and interpret particular problems (such as the recovery of vegetation following the reduction of introduced domestic animals). Third, for those members of the team yet unacquainted with the Islands, their pre-field proposals for inventory could be reviewed with the experienced park officers and Darwin scientists. Fourth, the team members could gather impressions and speculate about the equipment that would be required for the inventory. And fifth, the team was able to make many pre-field arrangements through correspondence because of the extensive knowledge of the Park and Station personnel. This capacity to describe, analyze, evaluate, compare, and discuss the area in abstraction was not possible in the planning context for Canaima in 1962.

Abstraction has several practical implications. The risk of taking the wrong equipment to the field is reduced. The team can become knowledgeable of the area before arrival and thereby design an inventory which seeks the answers to the key questions. And, the team will not easily be mislead by the common error of generalizing their limited knowledge from very unique experiences. For example, the 1973 planning team carried out their work during the typically cool, foggy ("garua") weather associated with the Humbolt Current. A follow-up mission made up of many of the same officers returned to the are in 1975 to further specify planning decisions. This second mission took place during the unpredictable Nino Current period which brings hot, relatively rainy (tropical) weather. One can well imagine the magnitude of planning errors had the only planning team visit to an unknown area been made during the unusual period such as the Nino Current in the Galapagos.

Additional practical implications of abstraction include the freedom from the basic tasks of navigation, exploration and survival. Higher planning efficiency (e.g., more hours of planning activity per unit of time in the field) was potentially available. On the contrary, in the case of the Canaima exercise in 1962, approximately one-half of the daylight hours of each day in the field were spent precisely on navigation, exploration along spur lines, and gathering of firewood, pitching tents on bare rock outcrops or searching for caves to serve as campsites. Often, camps would be established early in the day to avoid risking the lack of suitable site or firewood by nightfall.

This point is important to stress: Risk and uncertainty are at play not only in the planning of the national park, but also in the planning, organization and management of the planning team itself!

In the Galapagos Islands there was already an established park organization functionally linked with a research station. The Darwin Station's research vessel -- the Beagle III -- and several smaller boats provided for the inter-island transport network. Rangers were already patrolling, controlling introduced feral animals, and managing tourism use in the Park. Maps of the Park were available. Literature was available on many aspects of the complex ecosystems of the Park. The little-studied marine environment was being investigated.[18] There were offices, housing facilities and services, and research laboratories and library. A radio connected the Park Headquarters with the central National Parks Office in Quito at the Forest Service.

The team initiated its field work from the Park Headquarters and the Research Station on Santa Cruz Island. Aboard the research vessel -- the Beagle III -- the team traveled and worked during 21 days inspecting key sites throughout the archipelago and preparing a rough draft plan for the Park. Later, the team finalized a draft of the Park plan at Headquarters during 14 days. The draft was then circulated widely in Ecuador and around the world. Ten months later, after the comments and corrections had been incorporated during a further 14 days of work, a second draft was submitted to the Director of the Ecuadorian Forest Service, who studied and approved the document, and submitted it to the Minister of Agriculture and Livestock. The final draft was published and carried the approval and mandate of the Ministry.

The method for the inventory can be synthesized briefly as follows:

1) Become acquainted with the area (in abstraction) by studying existing maps, literature, aerial photographs and satellite imagery, and by communicating with knowledgeable individuals.

2) Sub-divide the area into TYPE units in terms of particular problems, uses, and opportunities. For example, in the case of Galapagos, a) recreation and tourism require evaluation and decision since they already comprise a large activity and utilize specific sites on several islands; b) tourism is transported and catered by ocean-going vessels rather than by fixed-base operations (hotels and restaurants) and warrants inspection and decision; c) science and research is a very important and well known service on the Park, its compatibility with tourism and with other objectives of the Park needs analysis and decision; d) marine resources are already being utilized for skindiving and fishing by tourism and for local requirements, yet the marine resources are little studied and decision must be made concerning future use of marine areas and research needs; e) the four villages and their expansion and agriculture zones need review and decision to ensure adequate harmony in development and management of the overall island ecosystem; f) and finally, the Planning Board wishes to ensure that adequate consideration is given to land-use alternatives for the Islands' terrestrial and marine habitats (cattle, fishing, etc.).

3) Analyze and evaluate those sites where high priority problems, uses and opportunities require decision. The team will not be able to physically visit all of the sites in the vast park area. By choosing key problems or sites for direct analysis and evaluation, the TYPE system will allow the team to generalize management and development decisions to other areas which are not be to visited by the entire team.

4) In the company of the park officers and scientists, cruise along shorelines and into inlets, and climb mountains and volcanoes to visually note lower priority areas. Extrapolate the information and criteria which has been established for the high priority sites which were visited by the entire team to those sites which, due to lower priority, will not be visited by the team.

5) Reformulate the gathered information and criteria into guidelines for supporting management decisions. The guidelines should specifically relate to the problems, uses and opportunities which were analyzed and evaluated during the inventory phase.

Several comparisons and contrasts can be drawn between the Canaima and the Galapagos exercises. First, in Canaima, the team followed a BASE LINE TRANSECT in a context of primary exploration. (Only one guide had been even partially across the top of the Auyan-tepui mountain and that only one time, years before). The line was extended and realigned as terrain and criteria evolved along the route. Spur lines were run daily as curiosity and new ideas developed. The terrain itself fed the imagination of the team members. In contrast, the Galapagos team went directly to specific pre-chosen sites which were well known by the park officers and scientists.

Second, in Canaima, it was the route which was chosen, the sites were met by search and by chance. In Galapagos, the sites were chosen, and the route was selected simply to utilize the most economical path to link the sites. Both methods, however, were subjected to the planners' curiosity and unrelenting questions, which typically led to deviations in the routing and the scheduling.

And third, the two methods differ in the role of the scientist. In the unknown area, the scientist will be busy collecting and taking notes. He will be working under ignorance similar to other expedition members. Only some time later, when the data are assembled and analyzed, will the scientist be able to offer specific explanations and guidelines. In contrast, the scientists on the Galapagos planning team were immediately in a position to support planning decisions with facts and principles, to support scientific problems and solutions, and to challenge the ideas of others in a constructive manner.

APPENDIX III-B

DEVELOPMENT SEQUENCE FOR SANTA ROSA NATIONAL PARK, COSTA RICA

CUADRO 2

SECUENCIA DE DESARROLLO DETALLADO CON INSTALACIONES Y COSTOS POR AÑO

Etapa	Año	Explicación	Costo Unidad	Total	Costo Año
I	1	Carretera de entrada hasta Centro Histórico con carreteras radiales equivalentes a 13 km, sitio de Almuerzos Campestres No. 1.	110.000	1.430.000	
		Carretera secundaria desde sitio para caballeriza hasta guarda centro Norte = 4.5 km	6.000	27.000	
		Entrada y carretera al centro de residencias y mantenimiento = 2 km	25.000	50.000	
		Parqueo al Centro Histórico con capacidad para 50 vehículos	200	10.000	
		Dos entradas a guardaparques, Norte y Sur, frente a carretera = 1 km	5.000	5.000	
		Drenajes, 50 alcantarillas menores – carretera entrada a Centro Histórico	2.000	100.000	
		Drenajes, 2 alcantarillas mayores, entrada guardaparques Norte y Sur	20.000	40.000	
		Taller mecánico sencillo en Centro de Mantenimiento	30.000	30.000	
		Instalación de vivero en Centro de Mantenimiento	27.000	27.000	
		Un taller, bomba provisional en Centro de Mantenimiento	12.000	12.000	
		Compra de terreno 1/10 de 11.700 ha a ₡100 por ha	100	170.000	1.941.000
I	2	Reconstrucción de la Hacienda y Centro Histórico	70.000	70.000	
		Inicio del Museo (interior de la Casa)	5.000	5.000	
		Corta de trocha en L. frontera Sur = 18.5 km	5.000	92.500	
		Construcción de cerca en frontera sur = 18.5 km	10.000	185.000	
		1 casa D, guardaparque, Noreste	12.500	12.500	
		1 casa D, guardaparque, Sureste	12.500	12.500	
		1 casa D, guardaparque, Centro Norte	12.500	12.500	
		1 casa B, guardaparque, Centro Residencial	26.000	26.000	
		1 casa B, Historiador Asistente, Centro Histórico	26.000	26.000	
		1 casa D, celador, Centro Histórico	12.500	12.500	
		Sitio de almuerzos campestres No. 1 con 10 mesas, 10 barbacoas, 3 llaves, unidad de 4 sanitarios	15.000	15.000	
		1 garage en Centro de Mantenimiento	12.000	12.000	
		Servicios de agua potable y aguas negras en Centro Histórico, Sitio de Almuerzos Campestres No. 1, 3 casas de guardaparque y Centro Residencial	165.000	165.000	
		Portón de entrada con caseta de información, rótulo en la carretera y frontera	5.000	5.000	
		Inicio de ornamentación	12.000	12.000	
		Entrada en Sitio de Almuerzos Campestres No. 1, equivalente a 1 km	10.000	10.000	
		Parqueo para 20 vehículos	200	4.000	
		Compra de terreno 1/10 de ₡1.700.000	100	170.000	847.500
II	3	Carretera desde el Centro Histórico hasta la playa con una sección en ladera = 20 km en 2 calidades 16 km terreno plano 4 km terreno ladera	 110.000 130.000	 1.760.000 520.000	
		Carretera de entrada y portón a guardaparque Sector Oeste, 1 km	10.000	10.000	
		Trabajo en el Museo	5.000	5.000	
		Parqueos y entradas para los sitios de acampar con 6 vehículos/unidad	1.200	3.600	
		3 unidades triples de acampar en la playa con 3 llaves, 4 sanitarios, 3 barbacoas, 4 duchas y 3 mesas/unidad	5.000	15.000	
		1 casa B, Guardaparque Sectorial, Sector Oeste	26.000	26.000	
		1 casa C, obreros, Sector Oeste	15.000	15.000	
		1 casa B, Naturalista Asistente, Centro Residencial	26.000	26.000	
		1 casa C, obreros, Centro Residencial	15.000	15.000	
		Servicios de agua para todos los desarrollos del Sector Oeste, con bomba, pozo, tanque séptico, tubería y planta para electricidad	70.000	70.000	
		Ornamentación	12.000	12.000	
		Compra de terreno 1/10 de ₡1.700.000	100	170.000	2.647.600
II	4	Carretera al Centro de Investigaciones con portón = 1 km	10.000	10.000	
		Corta de trocha en frontera Norte = 22 km	5.000	110.000	
		Construcción de cercas en frontera Norte = 22 km	10.000	220.000	
		Parqueos en Caballeriza (5 vehículos), Centro de Investigación (5 vehículos), Casa de dormitorios (5 vehículos), sitio de Almuerzos Campestres	200	5.000	
		Construcción de Caballeriza, establos, bodega, herrería, corrales, etc.	60.000	60.000	
		Sitio de Almuerzos Campestres No. 2 completo con 10 mesas, 10 barbacoas, 5 llaves y 4 sanitarios	15.000	15.000	
		Trabajo de museo	5.000	5.000	
		1 casa A, superintendente, Centro Residencial	40.000	40.000	
		1 casa A, Jefe de Ingeniería y Mantenimiento, Centro Residencial	40.000	40.000	
		1 casa A, Guardaparque Jefe, Centro Residencial	40.000	40.000	
		1 casa B, Oficial Administrador, Centro Residencial	26.000	26.000	
		1 casa D, Celador, Caballeriza	12.500	12.500	
		1 casa C, obreros, Caballeriza	15.000	15.000	
		1 casa A, Naturalista Jefe, Centro Residencial	40.000	40.000	
		1 casa B, Secretarias, Centro Residencial	26.000	26.000	
		Servicios de agua y electricidad para la Caballeriza y sitio de Almuerzos Campestres	40.000	40.000	
		Senderos para peatones y jinetes en la sabana entre la Caballeriza y Centro Histórico = 26 km, limpieza sencilla y rótulos	50	1.300	
		Rótulos para Caballeriza, sitio de Almuerzos Campestres No. 2 y la frontera Norte	15.000	15.000	
		Ornamentación	12.000	12.000	
		Compra de terrenos – 1/10 de ₡1.700.000	100	170.000	936.800

Source: Miller, K. R. y K. R. von Borstel. 1968. Parque Nacional Santa Rosa, Costa Rica. Plan Propuesto de Manejo, IICA/ICT, Turrialba. pp. 61-68.

II	5	Cortar trocha la frontera Este = 7.5 km	5.000	37.000	
		Construir cerca en la frontera Este = 7.5 km	10.000	75.000	
		Trabajo de museo	5.000	5.000	
		Parqueos y portones para sitios de acampar (6 vehículos), Mirador (10 vehículos), Sabanero (10 vehículos), sitio rústico (10 vehículos)	200	7.200	
		3 unidades triples de acampar en la playa con 3 llaves, 4 sanitarios, 3 barbacoas, 4 duchas y 3 mesas por unidad	5.000	15.000	
		1 sitio rústico de acampar en la playa con mesa, barbacoa sencilla, sanitario sencillo y llave	3.000	3.000	
		3 sitios de acampar en el bosque, con refugio, barbacoa, sanitario sencillo más 1 sitio para carpa, 1 sanitario rústico y barbacoa sencilla	8.000	24.000	
		1 casa D, Guardaparque Estacional, Sector Oeste	12.500	12.500	
		1 casa D, Guardaparque Estacional, Centro Residencial	12.500	12.500	
		1 garage, Centro de Mantenimiento	12.000	12.000	
		1 bodega, vivero, Centro de Mantenimiento	5.000	5.000	
		1 bomba, Centro de Mantenimiento	10.000	10.000	
		1 taller-garage, Guarda Sector Oeste	12.000	12.000	
		Construcción del Mirador	3.000	3.000	
		Construcción del Sabanero	3.000	3.000	
		Construcción de senderos más cortos y conexión circular = 56 km, limpieza sencilla y rótulos	50	2.800	
		Rótulos en el Mirador, Sabanero y frontera Este, etc.	2.500	2.500	
		Ornamentación	12.000	12.000	
		Compra de terrenos 1/10 de Q1.700.000	100	170.000	424.000
III	6	Centro de Visitantes	210.000	210.000	
		Centro Turístico con 10 unidades de Almuerzos Campestres y 5 de acampar. Almacén con venta de comestibles, refrescos, carbón y una oficina	63.000	63.000	
		Trabajo de museos (casa y Centro de Visitantes)	15.000	15.000	
		Parqueos, entradas, portones y carreteras para los Centros de Visitantes y Turístico = 6 km	10.000	60.000	
		50 vehículos en parqueo Centro de Visitantes	200	10.000	
		40 vehículos en parqueo Centro Turístico	200	8.000	
		1 casa D. Huéspedes, Sector Oeste	12.500	12.500	
		1 casa D, Naturalista Estacional, Sector Oeste	12.500	12.500	
		1 casa B, Huéspedes, Centro Residencial	36.000	36.000	
		1 casa D, Naturalista Estacional, Centro Residencial	12.500	12.500	
		Rótulos en los Centros de Visitantes y Turístico	10.000	10.000	
		Ornamentación	12.000	12.000	
		Compra de terrenos 1/10 de Q1.700.000	100	170.000	621.500
		Carretera del Sector Sur del Centro Histórico hasta la Caballeriza = 5 km	110.000	550.000	
		Drenajes, 10 alcantarillas menores	2.000	20.000	
		Entrada, portones y carretera para sitio de Almuerzos Campestres No. 3 = 12 km	10.000	10.000	
		Parqueo para vehículos en el Sitio de Almuerzos Campestres No. 3 (20 vehículos)	200	4.000	
		Sitio de Almuerzos Campestres No. 3 completo con 10 mesas, 10 barbacoas, 5 llaves y 4 sanitarios	15.000	15.000	
		Trabajos de museo	15.000	15.000	
		Rótulos en Sitio de Almuerzos Campestres No. 3	3.000	3.000	
		Ornamentación	12.000	12.000	
		Compra de terreno - 1/10 de Q1.700.000	100	170.000	799.000
III	8	Carretera Sector Sur, entrada hasta Centro Histórico = 5 km	110.000	550.000	
		Drenaje, 20 alcantarillas menores	2.000	40.000	
		Drenajes, 1 alcantarilla mayor	20.000	20.000	
		Parqueo, entradas, portones y carreteras para los sitios de Almuerzos Campestres Nos. 4 y 5 y acampar = 2 km	10.000	20.000	
		Parqueo para 20 vehículos en Sitio No. 4	200	4.000	
		Parqueo para 20 vehículos en Sitio No. 5	200	4.000	
		Parqueo para 6 vehículos por Unidad de Acampar	1.000	3.000	
		Trabajos de museo	15.000	15.000	
		Sitio de Almuerzos Campestres No. 4 completo con 10 mesas, 10 barbacoas, 5 llaves y 4 sanitarios	15.000	15.000	
		1 Sitio Rústico de acampar en la playa, con 1 mesa, 1 barbacoa sencilla, llave y sanitario sencillo	3.000	3.000	
		3 unidades triples de acampar en la playa completas, con 3 llaves, 4 sanitarios, 3 barbacoas, 4 duchas y 3 mesas por unidad	50.000	150.000	
		Rótulos	7.000	7.000	
		Ornamentación	12.000	12.000	
		Compra de terreno 1/10 de Q1.700.00	100	170.000	1.028.000
IV	9	Parqueos, entradas y carreteras para sitio de Almuerzos Campestres No. 6, 20 vehículos	200	4.000	
		Parqueos, entradas y carreteras para sitio de Almuerzos Campestres No. 7, 20 vehículos	200	4.000	
		Parqueos, entradas y carreteras para sitio de Almuerzos Campestres No. 8, 20 vehículos	200	4.000	
		Parqueos, entradas y carreteras para sitio de Almuerzos Campestres No. 9, 20 vehículos	200	4.000	
		Parqueos, entradas y carreteras para sitio de Almuerzos Campestres No. 10, 20 vehículos	200	4.000	
		Sitio de Almuerzos Campestres No. 6	15.000	15.000	
		Sitio de Almuerzos Campestres No. 7	15.000	15.000	
		Sitio de Almuerzos Campestres No. 8	15.000	15.000	
		Sitio de Almuerzos Campestres No. 9	15.000	15.000	
		Sitio de Almuerzos Campestres No. 10	15.000	15.000	
		Sitios para Almuerzos Campestres sencillos, en la carretera Sur, entre la playa y Centro Turístico con 13 unidades de mesas, barbacoas y llaves	1.000	13.000	
		Centro Turístico, con 5 unidades de Almuerzos Campestres, 5 mesas, 5 barbacoas, 5 llaves y 4 sanitarios	7.500	7.500	

		3 unidades de acampar con 5 sitios para tiendas de acampar, 2 llaves, 2 sanitarios, 5 barbacoas, 3 mesas, 10 sitios para remolques, 10 llaves, 6 sanitarios y 10 barbacoas	8.000	8.000	
		1 sitio para acampar	15.000	15.000	
		6 sitios de acampar en el bosque con refugio, barbacoa y sanitario sencillo	5.000	30.000	
		Sitio de acampar con parqueo para 20 vehículos	200	4.000	
		Carretera de 3 km para sitio de acampar	10.000	30.000	
		Trabajos de museo	15.000	15.000	
		Rótulos	10.000	10.000	
		Ornamentación	12.000	12.000	
		Compra de terreno – 1/10 de ₡1.700.00	100	170.000	409.500
IV	10	Compra de terreno – 1/10 de ₡1,700.00	100	170.000	170.000
		Otro**			
		Sub-Total 10 años			₡ 9.824.900
		7% Imprevistos			687.743
		COSTO TOTAL			₡ 10.512.643

**IV	10	Se puede elegir invertir en la asfaltación de carreteras y parqueos en este último año o más tarde		
		Asfaltado de las carreteras principales = 43 km, más 14 km de entradas, rotondas, etc.	/km: 100.000	5.700.000
		Asfaltado de los parqueos principales a 20 m^2 por vehículo y para un total de 478 vehículos	/m^2: 20	1.912.000
		Costo de Asfaltado		₡ 7.612.000

CUADRO 3

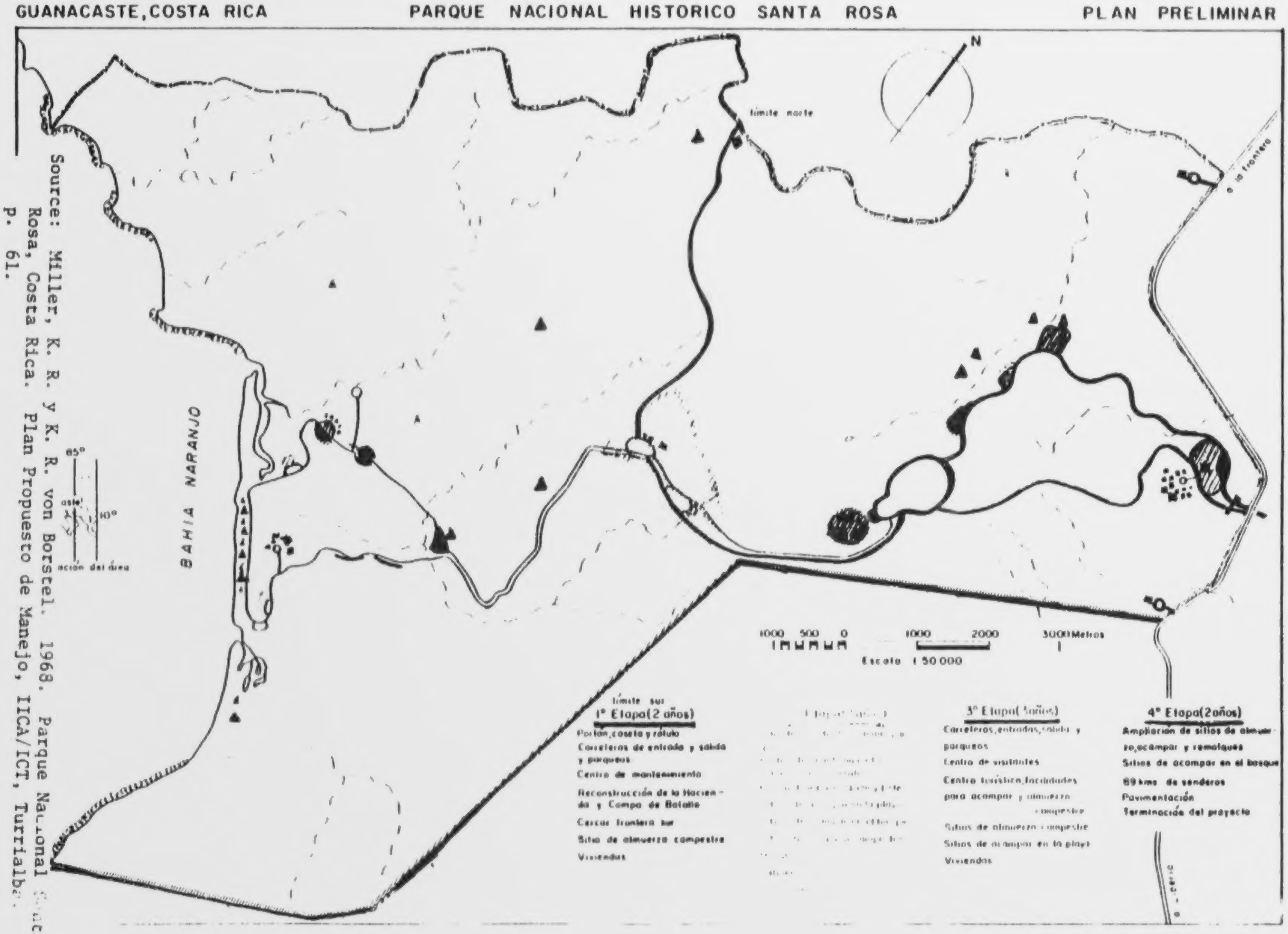
RESUMEN DE LA SECUENCIA DE DESARROLLO

Año	Colones 1968 Inversión por año
1	₡ 1.941.000
2	847.500
3	2.647.600
4	936.800
5	424.000
6	621.500
7	799.000
8	1.028.000
9	409.500
10	170.000
Sub-Total	9.824.900
% Imprevistos	687.743
COSTO TOTAL DEL PROYECTO*	₡ 10.512.643
PROMEDIO DE INVERSION POR AÑO Sin costos operacionales y personal, y asfaltación	₡ 1.051.264

* Agregando los costos de asfaltación	₡ 10.512.643 + 7.612.000
	₡ 18.124.643

APPENDIX III-C

GRAPHIC PRESENTATION OF DEVELOPMENT SCHEDULE FOR SANTA ROSA NATIONAL PARK COSTA RICA


GUANACASTE, COSTA RICA
PARQUE NACIONAL HISTORICO SANTA ROSA
PLAN PRELIMINAR
N
límite norte
a la frontera
BAHIA NARANJO
85°
oeste
10°
ación del área
1000 500 0 1000 2000 3000 Metros
Escala 1:50 000
límite sur
1° Etapa (2 años)
Porton, caseta y rótulo
Carreteras de entrada y salida y parqueos
Centro de mantenimiento
Reconstrucción de la Hacienda y Campo de Batalla
Cercar frontera sur
Sitio de almuerzo campestre
Viviendas
3° Etapa (5 años)
Carreteras, entradas, salida y parqueos
Centro de visitantes
Centro turístico, facilidades para acampar y almuerzo campestre
Sitios de almuerzo campestre
Sitios de acampar en la playa
Viviendas
4° Etapa (2 años)
Ampliación de sitios de almuerzo, acampar y remolques
Sitios de acampar en el bosque
89 kms de senderos
Pavimentación
Terminación del proyecto
a Liberia

Source: Miller, K. R. y K. R. von Borstel. 1968. Parque Nacional Santa Rosa, Costa Rica. Plan Propuesto de Manejo, IICA/ICT, Turrialba. P. 61.

APPENDIX III-D

DEVELOPMENT SCHEDULE NARRATIVE FOR SANTA ROSA NATIONAL PARK, COSTA RICA

STAGE I

During Stage I (which will cover two years, from the first year until the end of the second year), the lands will be purchased; the most urgent fencing (the east and south boundaries) will be given protection; the Historic Center will be reconstructed; and, one picnic area will be developed. The park entrance and basic installations such as sanitation, personnel housing, water, electricity and a plant nursery will also be built.

During the two-year period the land recommended for management within the park will have been purchased. Efforts will then be concentrated to protect natural and historic values, offer picnic services, restore the historic hacienda and related items, and to supply housing for those limited personnel which must live within the park. These facilities will be provided the necessary infrastructure. A small and temporary mechanic shop will be required for maintenance during the first stage until the proposed Maintenance Center is developed.

By acquiring the land during the first period, savings may be realized since land values are expected to rise drastically in the coming years. And, the moment is politically appropriate to make this purchase. It is urgent that the eastern and southern boundaries be marked and controlled since domestic livestock and fire are penetrating freely into the park, and the principal access for squatters is through the southeast corner. The other boundaries can wait until a later period. The eastern Sector of the park consists of a mosaic of savannah and tropical dry forest formations. This area can be rehabilitated for recreational use only with careful design and protection since the fire during the prolonged dry season (6-7 months) would place both the resource and the visitors in danger. Furthermore, illegal hunting will probably become a major problem in this sector should wildlife populations increase in response to several years of protection.

The principle roads which will be required for access to the Historic Center and the single suggested picnic site will be constructed with gravel. The major drainage structures for the road will be built with the road itself to avoid the need for reconstruction in subsequent periods. The expected visitor use for the first decade of use does not justify paving principal roads, and it is considered important to maintain the greatest possible flexibility during the early period of park management and development. In this way it will be feasible to make adjustments and corrections in road alignment or location as experience proves necessary.

The Historic Center constitutes the most known attraction of the park and one of the nation's most valuable sites of cultural heritage. The hacienda needs to be stabilized urgently, and the remaining artifacts of the historical period which are still to be found in the Guanacaste area should be acquired to furnish the center. The construction of a well designed entrance for the park will call the attention of travelers along the Pan American Highway. The park will become an element of the international tourism system in Central America. It is expected that the park will form an economic development pole for northwestern Costa Rica, and that in close cooperation with the Costa Rican Tourism Bureau (ICT), it will be possible to support the local economy.

Basic installations for water and electricity are required for the recreation, residence, historic and maintenance areas. It is assumed that the requirements for water and electricity during the early years will not justify large installations. Therefore, small, portable and provisional units are suggested. A plant nursery must be established immediately to begin preparing landscaping materials for the Historic Center (with native species, which without silvicultural assistance will take decades or centuries to become established through natural plant succession).

Therefore, during a two-year period, the visitors will be able to enter the park from the Pan American Highway, enjoy a picnic amidst the wildlife and plants of savannah and forest, visit the historic hacienda and the battlefield, and return. The visitor will be safe, and the resources of the park will be protected. Portable water and sanitary facilities will be available. By the very absence of roads and installations to the west of the Historic Center, the visitor will not be encouraged to travel to the Western Sector of the park where ecologists are working with planners to provide the necessary management guidelines for that area.

Only the necessary developments have been made. Yet, sufficient development has been done at one time to create a functional unit (a critical mass) which can be sustained on a basic operations budget in the event that the development budget is cut. There are not half-built buildings, no water lines without use, nor half-leveled roads. This part of the park could be maintained and offer services until such time that the development budget is re-established.

STAGE II

During Stage II (which covers three years, from the third to fifth years), the Western Sector of the park will open, including protection, gravel roads, trails, and several picnic and camping sites near the beach. One fully functional section of the horses' stable will be constructed to rent riding horses to visitors. An over-look and interpretative facility will be constructed near the estuaries. An interpretative exhibit will be installed to illustrate the extraction of salt from the sea by primitive methods. And, the Research Station will be built which will be operated in cooperation with the University.

Following the two-year period during which detailed studies and plans for the Western Sector will have been completed, the gravel road will be built from the Historic Center to the Beach. The road will be built to final specification: where it descends along the escarpment. This will minimize costs and ecological impact by avoiding temporary cuts or fills and subsequent reconstruction. Picnic and camping services will be offered in a beach environment and have a water supply based upon simple engineering systems. The first foot and horse trails will be opened. The remainder of the park boundaries will be fenced to control domestic livestock. More residences for park personnel will be built together with the necessary infrastructure.

The second stage will expand the services for park visitors to include hiking, horse travel, camping and picnicking in the lower forests and along the beach. The visitor will be able to learn about the estuaries, the old sources of salt from the sea, the general history of the region and the ecological values of the park.

Again, the new installations for water, electricity, roads, maintenance and recreation form complete units. Thus, at the end of the first five years, the park could function if necessary with an interruption in investment funds. During this entire stage, the ecologists and interpreters have been provided the necessary elements to collect and prepare materials for the future Visitor Center. The camping areas include sites with prepared grounds and sanitary facilities and shower, as well as rustic simple sites. Both are relatively near the beach; the first have automobile access, the latter require a small hike. In this way, different types of camping are offered according to the preferences of the visitor. This will provide the manager with an initial basis for observation of visitor behavior and preferences.

The trails to be constructed during this period are only those which are relatively short and return to the place of origin. This will permit the average visitor to take a short hike without concern for orientation or for means to return to his automobile or bus. Signs will be located in appropriate locations to orient visitors and provide them with the necessary information.

STAGE III

During Stage III (which will cover three years, from the sixth to the eighth year), the experience of the previous five years will begin to be utilized. This is the moment in which a fundamental review of the program is justified. This is the moment to review all criteria and establish the basis for making the large investments of Stage III. It is anticipated that the Visitors Center will be built, stable will be enlarged, and a series of roads, campsites, trails, and infrastructure will be added.

The first five years provided the foundation for beginning to learn about the preferences and behavior of visitors and scientists along with the various problems of management and protection. This is the moment to initiate an important period of re-planning, where plans can be adapted to what has actually happened in practice. Surely unexpected problems have arisen, and perhaps the expected problems never appeared.

In this way, the implementation of heavy investments is based upon confidence derived from practice and knowledge. This experience should include a cultural interpretation of the Costa Rican people with respect to their concept of a national park. And, management principles will be evolving which are based upon on-the-job training and experience. Such aspects as the handling of heavy equipment and machinery, public relations, maintenance, administration, and visitor reception and control will no longer be unknowns. It now becomes reasonable for the first time to consider the permanent installation of water and electric systems, a maintenance facility and other infrastructure. All eight factors which influence the development sequence will have had time to be considered.

Towards the end of the third stage, that is, during the eighth year of the sequence, all of the different types of services contemplated by the park plan will be available.

The park will be in full production: the natural and historic resources will be conserved yet be providing recreational and educational services to the general public; science and education in the country and continent will be supported; and, the local economy will be receiving the impact of tourism and recreational movement through the area.

STAGE IV

Finally, during the fourth stage (which will cover the ninth and tenth years of the sequence), primary efforts will be given to analysis and adaptation. According to the experience and the results, additional services may be added as indicated, longer and larger trails may be built, and if warranted, the major roads and parking lots may be paved.

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CHAPTER IV

THE EVOLUTION OF NATIONAL PARK PLANNING IN LATIN AMERICA

Introduction

The national parks of Latin America have been under the leadership and control of individuals with strong technical ties to land management and nature conservation since their initiation. Even the earliest parks benefited from field studies and from plans for projects for the protection of rare and endangered species and recreation and tourism facilities. As demonstrated in Chapter II, most parks in Latin America provide some practical conservation measures for watersheds, ecological diversity, genetic materials, and opportunities for recreation and tourism.

During the 1960's more comprehensive planning efforts were underway. Pioneering and relatively isolated plans for parks were initiated by interested and dedicated individuals. These early plans began with support from the park planning experience of Europe and North America. They adapted the methods and techniques to fit to Latin American context.

Through regional and international meetings, seminars and study tours, and the efforts of technical cooperation projects, these planning methods and techniques have been shared by park managers from throughout the region. Many concepts and principles have been found to be quite transferable from site to site and country to country. Guidelines can be shared without the need for "reinventing the wheel" everywhere.

Perhaps most significantly, it has become clear that planning exercises are in themselves excellent opportunities for training park personnel. What better way can a park manager learn about the nuts and bolts of his job than actually to design that job?

In the ever changing context of Latin America there is need to make national parks responsive to the dynamic nature of the nations themselves. Rather than relying upon plans which pretend to give "the final word" on how the park is to be managed and developed, the trend is to employ planning as a process which helps park managers respond to new knowledge, information and societal demands.

The public organizations in charge of forestry, national parks and wildlife resources have begun to reassess their responsibilities in light of increasing rates by which wildlands are being altered for agricultural, timber, livestock and other developments. How much wildland should be retained to assure the nation its supply of wildland goods and services? Several nations are responding by planning entire national systems of parks and reserves.

As nations examine their resources and requirements in a systematic way, it is not uncommon that they find themselves sharing ecosystems, river basins and cultural monuments with their neighbors. Thus, they not only share certain of their resources but also their destiny because of these common resources. From this realization have grown concepts and practical efforts to coordinate neighboring national systems of parks and reserves.

Most of these experiences have been gathered by scattered individuals or by groups of two or three. They have been documented in mimeograph form and only occasionally published (when funds were available). This chapter will attempt to bring this wide-spread experience together into a cohesive unit. As far as possible, credit will be given to those individuals or organizations responsible for the innovations and ideas. The work is the product of many individuals working together in the field, during international conferences or through the mail when separated by hundreds or thousands of kilometers.

The chapter will attempt to present the planning experience of Latin America in ten chronological stages. The important characteristics of key planning experiences will be summarized and their contributions to the overall evolution of planning will be noted.

The development of training programs for park professionals on the subjects of planning and area management is given particular attention since these efforts set in motion a flow of university graduates oriented and capable of becoming conservation area managers at the professional level. Simultaneously with the initiation of formal professional training, manuals on park planning, interpretative planning, wildland systems planning and multiple-use planning were prepared. Ecological guidelines for development planning were prepared and published during the same period to help bridge the gap between resource ecologists, managers, economic planners and decision makers.

Finally, the evolution of park planning as a fundamental function of park organizations will be briefly discussed. As planning becomes specialized it often becomes an "office" unto itself. It runs the risk of isolation, participation grows limited, power is inadvertently concentrated, and the decision-making process becomes generally resistant to learning from past experience. Subsequent chapters will present planning methods which have demonstrated their ability to provide for broad participation of personnel and a rapid accumulation of experience. Furthermore, these methods provide the basis for the development of management capacity for the entire park department.

Evolution of Park Planning Experience

The manager of every national park has probably always had a "plan" in his mind for the area under his responsibility. Most governments employ some amount of annual programming and budgeting, which requires ideas and images about what shall be done and where. Office memoranda and maps contain references to these ideas over the years.

During recent field investigations by the author in wildland areas throughout Latin America virtually all area managers had concepts concerning the management and development of their parks. However, informal and unwritten plans are difficult to transfer to subsequent managers, and to share and discuss with fellow park personnel, legislators, scientists, educators and the general citizenry. It was impressive during each visit to the park, how much time and effort each area manager spent attempting to deduce (or divine) "what the previous manager had in his mind when he did this or that."

The written planning document permits one and all to read the concepts and ideas of the managers and planners and provides for the understanding and evaluation of the plan during future periods. It is no longer a matter of an individual and his ideas in isolation, but an institutional process by which the park department, the government and the people can participate. The ability to evaluate plans provides the basis for improving the capacity to plan. In the process, managers learn how to manage. And the people can articulate how they wish their natural and cultural wealth to be handled.

By 1976, over 55 plans and planning documents had been prepared for Latin America's national parks. Some of these documents are PLANS as per the criteria developed in Chapter III. Others are reports, articles or studies on related topics but offer suggestions, data, principles or other building blocks of major importance for the development of the planning process. Some of these documents have been published and circulated widely around Latin American and the world. Others remained as mimeographed reports or single-copy proposals.

It is tempting to list the plans and to evaluate them, and particularly, to test their usefulness, influence or impact upon management and development. Such analysis would be important for the development of principles and to ensure adequate learning from past work. However, in light of the high risk of subjectiveness and possible biased interpretation of all-too scarce information, it is considered more useful to (a) illustrate the contributions of many of the works to the development of planning techniques, methods and capacity; (b) to give credit to the key individuals, groups and organizations behind these works; (c) to provide insight to the evolution by which planning is being developed, and (d) to provide insight into the process by which park planning capacity matures and supports management to face bigger and more complex objectives.

These four points can be perhaps most easily grasped by viewing the development of park planning in Latin America as a series of ten rather distinct STAGES OF WORK:

1. Pioneering State
2. Early Development of Techniques for Planning
3. Early Team Planning and Institution Building
4. Planning for Alternative Uses of Wildlands

5. Planning Guidelines and the Transfer of Technology
6. Team Planning and Training as an Institutional Process
7. Planning as a Dynamic Process
8. Recognition of Influences Upon and Responsibilities of National Parks
9. Planning of Park Systems and as Park of National Development
10. Planning National Park Systems at the Inter-Country Level.

The stages are listed in an order which attempts to illustrate, in a generalized manner, the evolution by which park planning is developed in a given country, or over the entire region taken as a whole. Most countries are working on two or three of these suggested stages at any one moment. Countries such as Costa Rica, Chile and Peru began with the pioneering stage and by 1976 were actively addressing virtually all of the stages on a simultaneous basis.

Stage 1. Pioneering Stage

The first attempt to prepare a formal and comprehensive plan for a national park in Latin America was made by the author at Canaima National Park, Venezuela in 1962.[1] The exercise can be characterized by a search for methods and techniques, a wilderness survey of 1,000,000 hectares and minimal logistical and institutional support. The study was carried out by an isolated expedition in what was then unmapped territory. While most of the plan was prepared by an individual, the other expedition members provided constant consultation and considerable exchange of ideas. The study included extensive regional analysis of agriculture, forestry, land-use alternatives, transportation, power development and mining. Consideration of legal, policy and institutional factors was interwoven into other elements of the plan.

The planning expedition made penetration transects across Auyantepui -- the mesa from which the 100-meter Angel Falls pours into the Churún canyon -- and it considered the implications of the management of the upper Caroní River on the development and utilization of the Guri Dam downstream.

The National Parks Office of the Ministry of Agriculture was faced with many challenges during the period following the study. Other programs such as colonization and protection had understandably higher priorities than Canaima, which in 1962, was a vast distant wilderness. While the study forecasted the coming land-use pressures on the Upper Caroní watershed, growing tourism, mining interests, and the highway plans for the linkages between Venezuela and Brazil, the effort was isolated and did not carry the commitment or intimate participation of the national government.

While the Canaima study probably had little influence upon the eventual management and development of the Park, it did serve to develop methods and techniques for park planning in isolated wilderness areas.[2]

During the period 1966-69, Pierret and Dourojeanni,[3] and Grimwood[4] worked on the selection and planning of the Pampa Galeras National

Vicuña Reserve and the Manu National Park. Their pioneering efforts established the basis upon which these areas in particular, and the subsequent conservation unit system of Peru in general, has been based. Their planning documents were normally in the form of field reports, which were carefully utilized by the National Forestry and Wildlife Department and the Forestry School of the National Agrarian University to manage and develop the areas.

During the same period, Wetterberg[5] and Putney[6] prepared formal written planning documents for Vicente Perez Rosales and Puyehue National Parks, respectively, in Chile. Their studies formed part of the program of work of the then Parks and Forest Reserve Administration of the Ministry of Agriculture, and as such, had direct influence upon the subsequent management and development of those parks.

These early pioneering planning studies shared in common their isolation from logistical or institutional support and established decision-making procedures. While they attempted to work closely with local park personnel, their studies were primarily "one man jobs." Government park departments were not yet prepared to participate in park planning and in the implementation of such documents.

Stage 2. Early Development of Techniques for Planning

The Forestry Sciences Department of the Graduate Education and Research Center, Inter-American Institute of Agricultural Sciences (IICA) of the Organization of American States initiated planning studies which attempted to combine the requirements of academic rigor and field pragmatism. In collaboration with FAO technical assistance and the land management agencies of the Costa Rican Government, planning studies were realized by Baptista[7] on Altos de Guayacán, Boza[8] on Volcán Poás, and Miller and Von Borstel[9] on Hacienda Santa Rosa.

The unique combination of research into allied fields (soils, wildlife, botany, history, economics of land use), the training of graduate students, and the search for practical techniques for the establishment of national parks in Costa Rica provided the context for developing more formalized planning methods. The Altos de Cuayacán study served to develop an early practical concept for the management of biological reserves. The Volcán Poás and Santa Rosa studies were concerned with the protection of habitats for already rare and endangered species of plants and animals. They also had concepts of conserving natural and cultural heritage. In Poás, the early colonization of the surrounding areas as well as the historical geology of the volcano flora, fauna and climate were carefully documented. In Santa Rosa, the Hacienda buildings and corrals which provided the setting for a major battle for national independence, were interwoven into the analysis of national resources and the conceptual management of the area.

All three studies were prepared before there was an institutional structure for the management of wildlands. In this sense, these studies form part of the Pioneering Stage. However, under the strong support of the Costa Rican Tourism Institute and the founders of the Forestry Department of the Ministry of Agriculture, a National Park Division was established in 1970, with the author of the Poás study as its first director. The Poás and Santa Rosa plans were implemented immediately, thereby becoming the first functioning national parks in Central America. Since that time, these documents and parks have served as training materials and sites for local and foreign park personnel, and as models for the management and development of subsequently established parks in Costa Rica.

The plan for Puyehue in Chile was elected for implementation beginning in 1971, and the document and the park were employed for training purposes, to be described below.

Stage 3. Early Team Planning and Institution Building

On a simultaneous basis with the Poás and Santa Rosa studies in Costa Rica, the Magdalena Valley Corporation (CVM) of Colombia was initiating a national park program. In 1965, local professionals began to plan Salamanca Island and Tayrona National Parks. In cooperation with the author as a consultant provided by IICA/FAO in 1966[10], strategies for management and development of national parks in Northern Colombia were suggested. Subsequently, Franky and Rodriguez[11] studied the natural resources of the area and gave particular attention to human settlement within the park boundaries. They prepared a preliminary management concept for the parks. In 1968, the CVM officers and the author prepared plans for both parks.[12]

Salamanca Island and Tayrona became the first national parks in Latin America to be planned on an interdisciplinary team basis. The field team lived in the parks during the studies. The entire exercise became a training program which supported the building of a parks department.

In 1970, CVM was transformed into the Natural Resources Development Institute (INDERENA) and the national parks unit of CVM became a Division of the new Institute. The officers in charge of the planning, management and development of Salamanca and Tayrona became the directors of national parks and wildlife for the nation.

The two parks also became important as training areas for new local and visiting professionals. And, significantly, Tayrona incorporated into its management and development, the Pueblito Archeological Site. Culture was interwoven with nature as a part of the conservation of the nation's heritage.

Stage 4. Planning for Alternative Uses of Wildlands

Many of the early planning studies concerned themselves with parks which already had been legally established and had need of planning documents to guide their management and development. In these cases, the land was already allocated for park use. The questions were concentrated on the area within the already established boundary.

Another level of work began to focus on the decisions for allocating wildlands before laws are drawn to define the national parks and other uses. These studies considered all potential land uses and conservation categories. Cacao, corn, recreation beaches, research stations, endemic species, watershed control, transportation, and the traditional rights of rural peoples were topics of open discussion. Additional expertise was sought where necessary in the search for the relationships of supply and demand for the many products and services from the land.

Among the earliest studies which considered a range of potential land uses sufficiently wide as to include conservation and wildlands were those of ecologists Holdridge and Tosi[13] and agricultural economist Plath[14] and his students. Although working from different basic models, both combined ecological and physical resources criteria with some economic criteria to analyze potential land use. Both stressed long-term stability and the need for conservation practices in all land uses. These studies call for the establishment of parks and reserves and for leaving large sectors in permanent forest cover for multiple-use management.

Mojica[15] studied the potential land-use options of the Revertazón valley of Costa Rica during 1967. Working essentially from a watershed management point of view, he compared his findings with those of Holdridge and Plath for the same area, and found that the three studies were in close agreement concerning the territory which should remain forest covered.

The land-use studies of the Organization of American States, for the Dominican Republic[16], Guayas Valley, Ecuador[17], and more recently in the La Plata River Basin, the Pilcomayo and the Darien[18], have all recommended that particular sectors of territory be managed in natural state or as multiple-use forestry.

In 1965, the Forestry Sciences Department at Turrialba, Costa Rica, initiated studies of wildland management. The first field exercise studied the management of agricultural, forest and marine resources and tourism developments of the Coco Beach area of Guanacaste Province, Costa Rica.[19] Subsequent studies included the Cahuita area along the South Caribbean coast of Costa Rica. There tropical agriculture and timber management were analyzed in combination with fisheries, marine coastal resources, especially the coral reefs, and rural development.[20]

Lemieux, one of the IICA graduate students, continued to work in Cahuita and studied the integral development of traditional and non-traditional land uses along the southern Atlantic coast of the country. His study resulted in the formal proposal for the Cahuita National Park[21] which was established in 1970.

In 1973, the Forestry Institute of the State of São Paulo, Brazil initiated studies on alternatives for the management of state-held wildland reserves. With the technical cooperation of Deshler and Thelen from the FAO Regional Project on Wildland Management, the Forestry Institute formed a planning team and examined the Cantareira, Ilha do Cardoso and Morro do Diabo state reserves. The alternatives included multiple-use forestry, sustained-yield timber production, tourism and recreation, ecosystem conservation and full conversion to non-wildland uses. Field analysis demonstrated the significance of the areas as wildlands. In the published plans for Cantareira[22] and Ilha do Cardoso[23], both areas are recommended for State Park status. The Morro do diabo is recommended for multiple-use. Subsequently, the Campo do Jordáo area was planned as a State Park.[24]

Foresters from the National Forestry Corporation of Chile and Deshler from the FAO Regional Project studied a section of the South Central Andes in 1973 and 1974 to consider alternatives for the management of the mountain lands. The team worked with a regional focus and carried no commitments to any particular category of wildland or non-wildland use. The final report and map[25] recommended areas for management as national forests, national parks, wildlife sanctuaries, agriculture and livestock lands, and tourism sites. Recommendations included specific references to road specifications, construction priorities and land use policies.

The National Forestry Corporation foresters and Wadsworth. Consultant for the National FAO Forestry Project, studied the land use situation of central Chile in 1974 to consider the implications of harvesting the native forests of the Andean slope and of the reforestation of the central valley and coastal mountains with exotic species. Wadsworth followed a method which forecasted demands for food and fiber. He studied the requirements for water for domestic, power and industrial uses. The importance of the fisheries resource and of the interdependence of that resource with careful stream management was stressed. In essence, the study[26] recommended that the Andean slopes be maintained in some form of conservation category in view of their most significant role in water production and their importance for recreation and tourism. It was argued that the central valley will be inevitably converted to food crops, and that the forest plantations for wood and pulp should be concentrated and expended on the coastal mountains where the growth rate is high and alternative uses are few.

The national planning exercise for the Galapagos Islands Province in 1973 was realized by an inter-ministerial commission. The Forest Service, together with collaborators from FAO, Unesco, and the Charles Darwin Research Station, prepared the draft plan for those portions of the Islands which correspond to the national park. Their work was prepared and reviewed in consideration of all the many diverse factors related to development in the Islands. The park plan[27] was approved by the Minister of Agriculture in consultation with the Cabinet, and was virtually incorporated verbatim into the overall planning document for the Islands.

These efforts to plan and analyze alternative uses of wildlands demonstrate methods for determining a more rational allocation of natural resources. Such methods can provide for greater harmony in overall rural development within which national parks and other wildland categories would have clearly defined roles. The recent study by Holdridge and Tosi[28] clearly demonstrates the important role of wildland planning in rural development. The study evaluates the possible ecological effects which could be caused by the construction of a water reservoir and the diversion of related water courses on the Arenal area of Costa Rica. The study recommends a series of limitations on land use in the area to protect the reservoir from sedimentation, and suggests the establishment of a national park or equivalent reserve in the watershed of the proposed reservoirs.

Stage 5. Planning Guidelines and the Transfer of Technology

The previously cited efforts were carried out on many areas in various countries throughout the region. Each experience was based upon weeks, months and even years of work. From these experiences it became possible to generalize and draw principles and guidelines for application to wildlands elsewhere.

Principles derived from specific experiences permitted a "transfer of technology" from one country to another. While such transfer was not new in park planning, what is significant is that the transfer began to take place among the countries of Latin America based upon experience within the region.

Consultantcies to particular areas in various countries provided the vehicle for the transfer of planning and management technology. Tobar, of the Renewable Natural Resources Department of the Panamian Ministry of Agriculture, in collaboration with FAO and bilateral consultants,[29] and in cooperation with the Panamian Tourism Institute, prepared a management plan for the Portobelo National Park.[30] A consultantcy by the author to El Salvador in 1973[31] assisted in the planning of permanent reserve status for the Monte Cristo area and its possible management on a cooperative, tri-national basis with Honduras and Guatemala. Subsequent studies on Monte Cristo, such as that by Dougherty,[32] further detailed and reinforced the proposal. The same consultantcy visits to El Salvador by FAO consultants provided advisory services to students working on a management plan for Denninger National Park.

During the 1960's and 1970's, similar consultantcies were made to Dominica, Ecuador, and Trinidad-Tobago, each serving to orient particular aspects of work in those countries. The experience of other countries from the region was shared. The 1973, in a consultantcy to Cuba, concepts and guidelines from Latin America experience were reformulated as appropriate to particular policies and development models being pursued in that nation. The work with the Physical Planning Institute, the Forestry Development Institute and the Tourism Institute demonstrated the way in which conservation management technology could be tailored to fit specific requirements.[33]

Consultantcies by professionals from among the Latin American countries became more numerous in the 1970's. Leaders from Argentina have consulted their colleagues in Paraguay. Interchange has occurred between Argentina and Chile, and Brazil and Peru. The Central American countries have initiated consultant exchanges at the inter-country level. Some international specialists who have worked in one or several countries of Latin America under the aegis of FAO, IICA, CATIE, Unesco, IUCN, WWF and bilateral technical assistance agencies, return to the region periodically, or are transferred from country to country. Nations with relative advancement in particular aspects of management have hosted colleagues from other nations. For example, the director of national parks for Ecuador worked for one month in Costa Rica during 1973 to observe field operations and implementation in that country.

Stage 6. Team Planning and Training as an Institutional Process

Planning appeared as a key vehicle for training professional personnel for park management by 1973. Two major thrusts had been developing: First, the Forestry Schools of the universities in Argentina, Brazil, Chile, Paraguay and Uruguay joined IICA and FAO to develop curricula in wildland management as a part of the overall forestry education. A survey and seminar took place in 1968.[34] An undergraduate course and a graduate course were given in 1969.[35] And finally, two workshops with a duration of 10 weeks each were given during the first quarters of 1972 and 1973.[36] The second thrust took place as individual countries worked with technical cooperation projects with FAO, Unesco, IUCN, WWF, OAS, or bilateral assistance programs to study, plan and develop conservation programs, strategies and capacities.[37]

These two lines of work provided the mechanism by which local and international professionals worked together on a daily basis as a normal part of their employment. They worked as colleagues in training, planning, management and development activities as part of a regular institutional process.

Particular examples of this stage are to be found in Chile with the planning of the Conguillio/Los Paraguas National Park,[38] Fray Jorge National Park,[39] Juan Fernandez Islands National Park,[40] Lauca National Park,[41] Rapa Nui National Park,[42] and Torres del Paine National Park.[43] Officers from the National Forestry Corporation, the Regional and the National FAO projects and local scientists worked together to plan the management and development of each area. In all cases, the international staff was in the minority and concentrated primarily on methodology, concepts, norms and criteria. As a general rule, the solutions were derived by the national personnel.

Similar experiences were realized in Paraguay with the planning of the Y'bicuy National Park[44] and in Ecuador with the Galapagos Islands National Park.[45]

Stage 7. Planning as a Dynamic Process

Just as the paper upon which plans are drawn turns yellow with time, so plans themselves become obsolete. Some plans such as those for Volcan Poás and Santa Rosa in Costa Rica required modifications by the time management and development of the areas actually began. The regional contexts were changing. Some suggested activities needed revision in light of new research information. At first the tendency was to make "new plans." It was soon realized, however, that a continuous planning process was involved rather than a new planning effort. New knowledge had been gained, both from research and as feedback from the implementation of the plan itself. the work of the Costa Rican professionals, FAO advisor Moseley, the research team of Peace Corps Volunteers and the landscape architect teams from the College of Environmental Sciences and Forestry at Syracuse University all added dimensions to the revision of the Poás[46] and Santa Rosa[47] plans.

The enthusiasm with which the Ecuadorian Government implemented the plan for Galapagos Islands National Park was such that it was soon necessary to plan several of the development areas in greater detail. The research work of marine biologist Wellington[48] provided the scientific basis for zoning the marine area of the park. The research of other programs at the Darwin Research Station supported further management decisions on such items as tourism use of the park. Several decisions taken in the original plan required re-examination.

During March 1975, the Galapagos Islands was the testing ground for the first formalized replanning exercise. The printed plan was not tossed overboard. A planning team on the Beagle III research vessel revisited sites where it was considered necessary to review earlier decisions. The new ideas and decisions were noted in official memoranda as "amendments," "revisions," or "additions" to the basic plan.

The most important aspect of this stage was the initiation of a disciplined process for treating the revision of plans on a dynamic and institutionalized basis. It was demonstrated that changes could be made in plans, and done so rather quickly, but that this was to be done only by following a systematic procedure to ensure against sudden abandonment of previous work and to guarantee that sufficient consultation was made.

Stage 8. Recognition of Influences Upon and Responsibilities of National Parks

Most park management efforts have historically been dedicated to the conservation of nature. Recognition has been given the role of parks in science, education, recreation and tourism, and to some extent, the economy. However, only indirect recognition has been given to (a) the many influences which are exerted upon national parks by surrounding factors (land use, transportation, air or sea currents, upstream-downstream flows and siltation, pesticides and fertilizers, human waste, etc.) and (b) the responsibilities of the parks to rural development and overall environmental conservation.

With the advent of planning, these influences and responsibilities are beginning to receive explicit attention. Plans for parks like Rapa Nui, Poás, Salamanca, Santa Rosa, Tayrona, and Torres del Paine give careful consideration to the influence of adjoining land uses. Virtually all of these, and other already cited plans, provide for research facilities including laboratories and dormitories. They also provide for large tracts of natural area to be managed as free as possible from human influences (including recreation), to provide explicitly for particular forms of nature management and research and monitoring activities. Other plans provide for zones dedicated to education, upstream protection, natural recovery of previously disturbed areas, fire control and management, and particular types of habitat treatment to ensure the survival of an endangered species. Cultural heritage in the form of history, archeology or anthropology, has been explicitly treated in specified zones.

The responsibility of park management to rural development is particularly illustrated by the water program proposed in the plan for Rapa Nui.[49] Much of the fresh water available on the Island for agricultural and grazing use comes from a series of natural and drilled wells along the southern coast. Several of the most important wells lie within outstanding archeological sites. The plan provides the basis for a compromise by which sub-surface water lines can be constructed to carry the water from the wells within the park to the agricultural and grazing areas beyond the park boundary. The additional cost is small compared to the added value to the community through irrigation and the protection of cultural heritage (which will remain available to tourism).

Traditionally, national parks have been viewed as antagonistic with the presence of native peoples. The use of natural resources by native peoples has generally been considered to "degrade" the value of the area as a representative sample of a biological formation. Hence, native peoples have often been removed from areas to be designated as national parks, or simply, the national park has been established elsewhere. Alternatively, national parks have been employed as mechanisms to "protect" native peoples and their claims to land, or to isolate them from Western development activities.

Two contrasting approaches to the harmonization of native peoples and national parks can be demonstrated by examples from Peru and Brazil. In the draft management plan of Manu National Park,[50] the Peruvian authorities and World Wildlife Fund consultant Jungius, provide explicit recognition of the presence of the native groups, their living areas and ranges of activities. Policies are suggested for two cases: one where a native group apparently chooses to remain isolated from so-called Western civilization, and the other where the group has already begun to employ Western technology. The first group is to be allowed to continue living within the park and to receive de facto protection from the park against outside influences. Not even the park officers are to approach the native peoples in that group. With the other group, however, the park officers are to give the people a choice: if they wish to return to a traditional way of life, they may remain within the park; if they prefer to work with Western technology and the related way of life, they must relocate to a new territory beyond the park boundary. Should the native peoples decide to relocate, the Forestry Department suggests that they consider an area adjacent to the park which is under the management of the Department and which can provide for a mixed traditional/Western life style.

In Brazil, the situation is entirely different. The Constitution of Brazil guarantees the rights of lands for native peoples. Furthermore, it provides for their exclusive rights to the utilization of the flora and fuana within those territories. Since it is illegal to utilize flora and fauna within national parks in Brazil, the presence of native peoples within national parks is simply inconsistent by law. In the Brazilian case, parks can only be created where native peoples do not have claims.[51]

Finally, one of the habitats least considered in conservation management has been the sea (including estuaries, coastlines, coral reefs, etc.). However, the plans for Chuita, Galapagos, Santa Rosa, and Tayrona include basic concepts regarding marine conservation. These plans have all benefited from marine research, such as that by Wellington,[52] whose studies provide the basis for management of the marine areas. Other plans which provide for explicit marine conservation include Fray Jorge, Juan Fernandez, Manuel Antonio, Paracas, Rapa Nui and Salamanca Island.

Stage 9. Planning of Park Systems and as Part of National Development

The location of most national parks had been chosen for reasons of natural characteristics. A shift in this approach occurred as park organizations began to design park systems for their countries. Rather than taking each area on a one-by-one basis as it was nominated for park status, the new approach has been to develop normative concepts concerning the kinds of areas which should become national parks, and then to go to the field and seek such areas as candidates for park management.

In this process of designing a conceptual park system, the park directors explicitly face choices among many areas from which to choose parks and other categories of reserves. There are choices among new areas and among existing areas. There are serious doubts about the quality and manageability of some of the existing older parks. And, there are choices as to the allocation of budget among the parks for investments.

Furthermore, the normative approach to planning provides the framework to organize priorities, to realign institutional mechanisms and then to begin linking park management with the national planning process. No nation can be sure of meeting its conservation objectives if the related conservation units are not explicitly recognized and harmonized with all other aspects of national development. the bulldozers may still show up at the boundary of the park. But if the national plan calls for a park, there is some basis for argument within the governmental hierarchy to deny access to the bulldozers.

Chile was the first country in Latin America to initiate formally a planning project concerning its overall park system. In collaboration with the FAO Regional Project during 1972-1974, the 49 national parks of the country were studied by Chilean park officers and scientists and FAO advisors.[53] The ecological provinces, the geomorphological units and the scenic units of the nation were mapped and correlated to design the normative park system. Utilizing eight criteria , the existing parks were evaluated in relation to the normative model. Several parks were found to duplicate each other or to be unmanageable in terms of containing the resources in quality, quantity and status capable of meeting the objectives of conservation. Several niches in the normative model were not represented in any existing park and suggestions were made as to where new parks should be established.

In the above cited 1973 planning experience in Cuba, the existing network of conservation areas was evaluated. Then, normative models were considered for various categories of management. The appropriate institutional framework for managing the areas was analyzed. Finally, the planning exercise focused upon the integration of the conservation effort for the nation's natural and cultural heritage into overall development planning. Specific mechanisms for treating the integration process at the national planning level were suggested.

With the national-level planning concept in mind, Putney and his Ecuadorian colleagues published a plan in 1976 for a national park and reserve system for the nation.[54] The study involved the participation of professionals throughout the Forest Service and from the scientific community. Numerical qualifications were assigned to each of the candidate areas, and criteria were established to identify those areas warranting inclusion in the park system.

Colombia published its first systems proposal in 1976.[55] While not as methodologically explicit as the other plans, it is based upon an extensive analysis of the remaining wildlands in the country, the critical habitats for particular plant and animal species, and general criteria for ecological representation of the nation's biogeographical regions. The map enclosed in the publication establishes the basis for planning a strategy to evaluate the areas suggested for study as potential conservation units.

The Amazon basin, perhaps the world's largest remaining continuous wildland area, has long eluded attempts to select parks and reserves on any systematic basis. Buried by ignorance and gross generalizations, the Amazon has been visualized as an "endless area of homogeneous green jungle." The diverse nature of the area in terms of soils, vegetation, fauna and other features has been demonstrated in recent years. The first attempt to approach this gigantic problem systematically was made by Wetterberg and colleagues at the Brazilian Forestry Institute.[56] the basic model correlates information from ecological research and from the government program for Amazonian development, to identify areas of priority interest. These areas are then to be studied as candidates for possible national parks, biological reserves or other wildland management categories. The original study was distributed to Brazilian and international planning agencies, research institutes, scientists and conservation groups requesting public review and feedback. The study was the first step in the analysis of natural areas for Brazil's national park systems plan and its basic recommendations were subsequently incorporated into the nation's Second National Development Plan.

The details of the Chilean, Ecuadorian, Colombian and Brazilian models will be elaborated in detail in Chapter VI.

Stage 10. Planning National Park Systems at the Inter-Country Level

With national programs underway, attention is turning to inter-country considerations. In most countries of the region, natural resources such as rivers, mountains, estuaries and coastal lands are shared by two or more nations. In most cases, biogeographical regions cross international boundaries. It has become obvious that inter-country cooperation can provide the basis for avoiding duplication of ecological coverage in parks and reserves, sharing the costs of training, sharing the talents and skills of national-level expertise, and designing national park systems which when viewed together cover the requirements for the entire region.

As already discussed in Chapter II, the Central American countries made the first attempt at inter-country planning for a regional system of parks and reserves. Regional meetings were held in 1974 and 1975 on the management of natural and cultural heritage. Key areas were identified. One pilot area in each country was nominated for immediate planning and management. Together with the technical cooperation of the FAO Regional Project, plans were prepared for each area within a context of team training. These plans,[57] together with policies and investment studies, have been integrated into the work of the Central American Bank for Economic Integration as integral elements of regional development.

The second effort at inter-country planning is now being realized by the six countries which share the Amazon watershed. The Inter-Governmental Technical Committee on Management and Amazonian Flora and Fauna, and the bilateral agreements between Peru and Brazil, have provided a framework and mechanism for realistic cooperation to establish unified criteria for natural area conservation, joint planning of conservation units, and an exchange of information.[58]

Planning and Management Workshops

The Inter-American Institute of Agricultural Sciences of the OAS made the above cited study in 1968 of the Forestry Schools in Argentina, Brazil, Chile, Paraguay and Uruguay. This study formed part of IICA's project with advanced educational institutions in southern South America, under the vision and dynamic leadership of Alfonso Castronovo.

Among the results of that study was evidence that few educational opportunities were available in the management of wildlands.

To put this concern into perspective: even _if_ the Latin American governments were to recognize the developmental and environmental importance and urgency of managing their nations' natural and cultural wealth, and _if_ they were to establish systems of parks and reserves to meet the necessary opportunities and responsibilities, _who_ would manage these conservation areas? _Where_ will the managers come from? _How_ will they receive the necessary training?

In response to the findings of the study, IICA initiated several activities. As already noted in Stage 6, a series of educational efforts in wildland management were initiated. In April 1969, a seminar was held in Iguazu National Park, Argentina, for forestry professors from the southern universities. The concepts of wildland management were presented, and discussions were held on the need for wildland managers in each country. The seminar then concentrated on the requirements for adding wildland management and related topics to the existing curriculum in each faculty, and to the means to develop faculty capacity to teach these materials.

The Forestry Faculty of the Austral University of Chile invited IICA to present a short course in wildland management to forestry students completing their fourth and fifth years. The sister forestry faculties of the southern countries were invited to send a professor to participate and observe the presentation of the material. IICA/FAO sent a professor to teach the short course, IICA supplied the scholarships for the visiting forestry professors, and the Austral Forestry Faculty made all local arrangements including field work in nearby Puyehue National Park.

As a result of the enthusiasm generated by the Austral University course, the IICA directors decided to offer scholarships to the forestry faculties to send professors to the Graduate School in Turrialba, Costa Rica, where they would join the regular one-semester graduate course in wildland management. From September through December 1969, five professors from the southern Universities worked intensively at Turrialba, and on field work in Costa Rica and Colombia.

By 1971 courses in wildland management or some related focus (watershed management, national park management) were being offered in each of the nine forestry schools. FAO continued to work with the schools in an effort to determine follow-up requirements. In cooperation with the FAO Regional Project on Wildland Management, the nine schools of forestry and the forest and park services of each of the five countries, a new project for technical cooperation was developed. The objective was to provide a concentrated training program and practical experience for the professors teaching wildland management. Most professors could not leave their faculty responsibilities for extended periods, nor did the schools have access to funds for scholarships to other continents. There were few opportunities locally for the professors to gain practical experience and few foreign universities offered programs of direct relevance to local needs.

The project provided for two, ten-week summer workshops, financial support for the purchase of library materials related to wildland management, and advisory services on curriculum development. The "First International Workshop on Wildland Management" concentrated on national park planning and was held in the Puyehue National Park, Chile during the first quarter of 1972. The professors worked through methods for planning, management and development. Field survey, inventory, mapping, conceptual analysis, design, engineering, budgeting, and final preparation of planning publications were treated during the workshop. All professors had previous experience to contribute; each contributed to the others. Planning exercises were realized in Puyehue and Vicente Perez Rosales National Parks, the results of which were presented to officers and directors of the National Forestry Corporation. Each professor finished the workshop with a full set of class notes and guidelines for theoretical and practical programs of teaching and research at his home faculty.

During the first quarter of 1973, the professors and FAO personnel met at Iguazu National Park, Argentina for the "Second International Workshop." The group concentrated on management methods and techniques and carried out field exercises in the park, in the Iguacu Park of Brazil, and other sites in Brazil and Paraguay. The participants examined the Y'bicuí area of Paraguay and lent support to its establishment as that nation's first national park. Again, specific exercises were realized to offer the participants an appreciation of the nature and characteristics of management. A "Management Prospectus" for Iguazu National Park and National Reserve was prepared and presented for discussion with the Argentine Minister of Agriculture.[59] Again, the professors returned to their faculties with a full set of class notes and guidelines, including the management prospectus and accompanying maps to serve as an example of the application of principles to a particular case in which they had personally participated.

The efforts of the countries of Central America and Panama to develop a regional plan for national parks and reserves have already been noted. In 1974, the FAO Regional Project assigned two officers to Central America to provide technical cooperation. Among the first activities requested by the governments was a training workshop for park managers and directors. The participants prepared a plan for Volcan Pacaya National Park,[60] Guatemala, as their major workshop activity. Subsequently, the FAO officers and national professionals were involved in the planning and establishment of demonstration or pilot parks in their respective countries.[61]

The major contribution of the workshops was the rapid, intensive and concentrated form in which methods and techniques were imparted to key individuals. They received direct field experience and were able to carry out planning, management and development tasks shortly thereafter. The workshop approach to education and training provided the context for "working together," for teaching each other, and for an intensive period of sharing. This synergistic aspect is of utmost importance to develop confidence and leadership qualities and to ensure adequate field experience, not as observer but as participant. Additional benefits included the spread of information on methods, techniques, concepts, norms and standards for wildland management, national parks, wildlife, watershed conservation and related fields.

Planning Manuals

Among the objectives of the FAO Regional Project, as requested by the natural resource institutions and universities, was the preparation of manuals on planning methods and techniques. Four manuals have been published and circulated widely:

> National Park Planning -- Guide for the preparation of management plans for national parks.[62]
>
> Planning Interpretative Programs -- Guide for the preparation of interpretative programs for national parks.[63]
>
> Planning Systems of Wildlands -- Guide for the preparation of plans for systems of conservation units.[64]
>
> Multiple Use of Renewable Natural Resources -- Guide for the application of the multiple-use concept to forest and wildland management.[65]

Based upon a variety of experience in wildland planning throughout Latin America and on other continents, the team of the Regional Project worked to deduce common practical methods for planning parks, interpretative programs, park systems and multiple-use areas. Many of the methods were tested in the various workshops and seminars, and were utilized to train park planning teams. The drafts of the manuals received discussion and criticism from Latin American professionals.

The manuals provided the first Spanish-language documentation on such subjects. They were presented in size, style and form so as to be accessible to virtually all interested individuals, and to be useful for educational and training efforts around the region. (The first three manuals were subsequently published by FAO in English and French.)

Ecological Guidelines for Planning

Probably the first systematic effort to provide ecological guidance to resource planning, management and development, is contained in the 1952 monumental book: Man's Role in Changing the Face of the Earth.[66] Early principles were established which pointed to the importance of ecological balance and careful integration of natural resources and human culture. Farvar and Milton's The Careless Technology[67] established the hazards of ignoring ecological factors in development planning. The complex principles and fundamentals of ecology were presented in pragmatic and easily read form in Ecological Principles for Economic Development by Dasmann, Milton and Freeman.[68] Specific sections of the book dealt with development goals, humid tropical lands, pastoral lands in semi-arid and sub-humid regions, tourism, agricultural and river-basin development projects.

The IUCN XII Technical Meeting in Banff, Canada in 1972, focused on the subject of "Conservation for Development."[69] Several papers concentrated upon such themes as "environmental quality in a changing world," "national and international environmental policies," "ecological, multi-disciplinary approach to development planning," "management of non-agricultural rural lands," "dynamics of vanishing species and their habitats," and "conservation of marine habitats."

Ecological guidelines became a major program item for IUCN during 1974 and 1975. In Latin America, the meeting "The Use of Ecological Guidelines for Development in the American Humid Tropics"[70] was held in Caracas, Venezuela in February 1974. Papers dealt specifically with "ecological guidelines for the management and development of National Parks and Reserves," "aquatic wildlife and fisheries," "natural forests in the development of the humid American tropics," the role of domestic livestock, pasture development, and other items related to agriculture and major engineering works.

Finally, ecological guidelines have been most recently prepared for the conservation of marine resources and marine habitats. The work of Dasmann and Ray[71] has established the basic concepts concerning critical marine habitats and alternatives for their management. McEachern and Towle[72] prepared Ecological Guidelines for Island Development to focus upon the peculiar problems associated with the careless planning of island environments.

These publications on ecological principles provide a succint translation and interpretation of scientific and technical concepts into a form which is useful for guiding management decisions. Planners can utilize this information to aid them in the most difficult task of blending ecological, engineering, economic and sociological criteria to form the basis for decision making.

Park Planning: A Tool for Democracy or Oligarchy?

The numbers of technically prepared personnel for park planning in developing countries are limited. In most park departments there is a small cadre of individuals who, regardless of their functional titles, are required to carry out a wide variety of tasks. It is not uncommon for a park department director to prepare park plans, write budgets, present plans and budgets to superiors, prepare contracts for construction in the parks, inspect the works, train guards and other local staff, etc.

Subsequently, it is common to find a strong pressure towards specialization. The tendency is for one officer to take charge of planning, another coordination, another interpretation, etc. The director can then distribute the work among his officers, and the "office" can become an "organization." Within this evolution, it is common for the function of planning to become specialized also.

Apparently it appears obvious and efficient to set up a section within the central office to take care of all planning tasks. With full-time planners in charge of the planning function, the director and other staff members can get on with their responsibilities.

This approach can lead to increased efficiency for the park department. However, several important dangers arise: First, whatever the specialist planners can learn about planning from courses, seminars and the like, they cannot learn about park planning in their own country until local experience is in fact gained. Until experience is localized, there is always the risk that national cultural values have not entered into the criteria for planning decisions.

Second, the specialization of planning, either by profession (e.g., architecture, forestry, agronomy, economics) or by individuals or groups, implies limited participation in designing and making planning decisions. All types of experience from diverse fields are required during planning exercises. And most important, this experience must come from all levels of the hierarchy of park management.

Third, specialized planners all too easily seek greater efficiency by keeping most decisions within the limited group. This sets the stage for an accumulation of power. Soon planners take the place of managers. It is all to easy for planners to make decisions themselves rather than present alternatives to the manager for his final decision. Not dissimilar to the alienation common between managers and accounting officers, planning specialists can easily fall into the trap of virtually duplicating the entire organization: They choose the problems to solve; they attempt to solve them; they give the solutions; perhaps evaluate their own work, and move on to bigger and better things. This dangerous situation is reinforced where the manager finds himself too busy and planning all too complex and he sends planners to do what he himself should be doing!

Fourth, and clearly related to the above, is the final form of danger from specialist planners and planning offices. The limited group, with limited participation and with an accumulation of power, tends to allow limited feedback into the planning process. And, most dangerously, there is only limited learning. In this situation, past experience does not necessarily lead to improvements in future planning. Things do not necessarily get better. The doors are closed! Worse, they're nailed shut!

Hence, what is indeed practiced in most other offices of government, and in the central planning bodies, is of dubious validity at least in the management of natural and cultural heritage resources. Planning for these areas is not a question of straight-forward engineering, architecture, irrigation, hydro-electric dams, statistics, construction programs, or GNP projections. Park planning, when taken to include the entire array of associated opportunities and responsibilities, is one of the most complex of planning tasks which simply cannot be delegated to a few individuals. The risks are too high and the values too important. And by the very nature of wildlands, the resources are either too fragile or too rare to take a chance with their survival.

There are alternatives to this problem for the developing country. Methods and techniques have been tested in various countries which demonstrate the feasibility of planning by integrated teams in which full participation of individuals from other fields and organizations and all hierarchical levels is encouraged. These efforts carefully nurture feedback and learning to ensure that experience is quickly gained and thoroughly utilized. In the process, all participants learn together. Everyone plans, and through planning, everyone learns something about management.

Finally, the key element of the team planning methods and techniques to be in subsequent chapters is *the use of planning as a mechanism for developing managers*. Those management personnel which will actually take charge of conservation units or programs are members of planning teams. Through helping to plan, they learn about the business which they are expected to operate. And, the plan for their operation has benefited from their experience along with that of all other participants.

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PLANNING NATIONAL PARKS FOR ECODEVELOPMENT

-- Methods and Cases from Latin America --

VOLUME II

by

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CHAPTER V

A PRACTICAL METHOD FOR PARK PLANNING

Introduction

National parks have been planned in various countries of Latin America as well as elsewhere in the world. As was presented in Chapter IV, there has been a gradual shift from ad hoc and bureaucratic procedures for planning of parks to more systematic, analytical, documented and formalized procedures. The shift also carries with it a growing awareness of the increasing role of national park management in national development and environmental conservation.

The most profound change has been one of fundamental concepts. Whereas some plans give principal attention to the design of physical developments -- roads, hotels, administrative buildings, tourist activities and the like -- the types of plans of interest here concentrate upon the understanding and management of the park resources for a wide range of services without the automatic domination of the park by any particular activity such as recreation and tourism. In the first case, the pre-condition is that "tourism and recreation will be developed; now, where can it be done with minimal damage or interference with nature?" In the second case, the pre-condition is simply that the "natural and cultural resources are being held in stewardship for a wide variety of conservation objectives; the requirements of society will change over time; the resources have a major role to play in the conservation of the environment and in economic development, yet they are fragile, unique, rare or the last remaining examples of representative ecosystems." In this latter case, portions of the natural and cultural resource will be always managed for direct use by the people, but in balance with all the other requirements placed upon the area.

This change is profound because it places emphasis upon management first, then development. That is, decisions must first be made with regards to the objectives of the area, the alternatives for which it could serve, and the role of the area in ecodevelopment. Decisions are made with loyalty to the natural and cultural resources system in name of the people for whom the park managers and planners are charged with custodianship. Loyalty does not lie with any one of the outputs -- neither recreationists, scientists, educators, politicians nor tourists have special preference to use the area.

This then puts the leadership where it belongs and provides a mechanism for avoiding the heavy power of any single interest group. It places the responsibility upon the manager, and puts the efforts of ecologists, scientists, engineers and architects in the proper perspective -- as services to the manager. The planning of the park is not a design profession problem, it is a problem of management. Physical planning is but a sub-set of the management planning effort. In this way, the dog is wagging the tail rather than the tail wagging the dog.

This approach is not to be taken as anti-visitor or anti-recreation, or super-protectionist. Quite the contrary, it is an attempt to place the energy of the entire resource into the conservation and development context of the nation, and to avoid the situation where any one output becomes dominant and forces inflexibility upon the resource (pavement, concrete, buildings, etc.) at the expense of other present or future requirements.

Certainly, at present in many countries or individual parks, it is the recreation and tourism services which utilize greatest planning time and detail at the area and site level. But, this should only be done after other alternatives have been properly weighed. And, it is to be anticipated that scientific, monitoring and educational activities will soon become critical and important to the national interest.

This chapter presents a pragmatic procedure for the planning of individual park areas. The procedure is built upon the principles set forth in Chapter III. It is based upon actual field experience in Latin America and elsewhere.

The method was first described and published in the FAO Park Planning Manual[1] already discussed in Chapter IV. This chapter will develop that model in greater detail. It will add the benefits of further study in several countries, such as the work of the Brazilian Forestry Development Institute[2] and of Wetterberg in Paraguay,[3] both in 1977. A definite separation will be made between the procedure for making planning decisions on the one hand, and the procedure for writing planning documents on the other.

The planning method carries seeds from the work done on the coast of Tayrona National Park and in the mangrove swamps of Salamanca Island National Park in Colombia which later germinated across the continent. The planning model is built upon each new experience from Volcan Pacaya to Torres del Paine, and from Y'bicui to Rapa Nui and Galapagos.

The planning documents produced by this method are not radical. In many cases they will appear very similar to plans prepared through quite different procedures and they will be similar in style and content. If anything is radical, it is the procedure itself which is followed to arrive at the planning document. The method provides for open interdisciplinary team participation. It guides the manager to ask those questions of greatest importance to him as he is actually attempting to manage the park. It provides the context within which local culture can express itself and eventually develop attitudes and perceptions of conservation management which are consistent with other dimensions of national culture and development.

The procedure also allows the manager to plan at the level of intensity which is most appropriate to his or her individual case.

Those managers beginning new parks or with little previous personal experience will place more emphasis upon conceptual ideas and will focus upon legislation and protection for their areas of responsibility. Subsequently, individual sections of the management plan will be elaborated as they are required to guide specific decisions for management and development. Eventually, the entire management plan will be written, but it will have evolved over a period of years simultaneously with the actual management of the park. (And, the management of the park will also have evolved because of having simultaneously prepared the plan.)

In cases where greater experience in wildland management is available, or where park management and planning is being taught in universities or post-graduate workshops, the entire plan can be prepared as one single exercise, either before field management is implemented in a new park, or parallel with management where a park has been operational for several years.

Thus, the intensity of planning can increase as it is warranted and useful. As noted in Chapter III, plans which are made too detailed or too early, risk being of little relevance once implementation actually takes place. Prematurely detailed plans may simply imply a waste of public funds. And, such plans are often based upon a gross over-extension of the manager's experience.

This chapter will first present a quick and general review of the planning method as a series of STEPS. The reader is urged to study these steps. Then, the method is presented in detail, giving examples from actual plans and planning exercises. Finally, outlines and procedures for the writing of planning documents are presented. Examples are drawn from various plans to demonstrate the different ways in which plans can be prepared to meet specific needs.

In Chapter II, several levels of planning were described which begin with the national development plan and proceed to the formulation of a national strategy for conservation units, a plan for a system of conservation units and the plans for the individual units themselves. As shown in Chapter IV, experience in Latin America demonstrates that planning generally has begun with individual parks, and has subsequently proceeded to the design of the system and the strategy. These cases are clearly in the majority since most nations have initiated planning after parks were already in existence, generally in response to the urgent need to make management and development decisions.

Conceptually, planning can proceed either way, from the strategy and system to the individual units, or vice-versa. Ideally, it is more logical to prepare a clear strategic framework and a proposed systems plan first, and then focus upon tactical details which are area-specific. In this way, each area has a defined role to play -- a niche to fill. Pragmatically, however, it is very important that the park managers and planners have experienced the planning of a park unit prior to planning a park strategy and a park system. Without experience and insight into the details of managing and developing a single conservation unit, their strategies and systems plans risk becoming abstract and detached from reality.

Therefore, at some sacrifice to the ideal, the presentation of planning methods will begin with the individual park in Chapter V, to be followed by park systems planning in Chapter VI and park strategy planning in Chapter VII. Thus, planning will proceed from the parts to the whole, from the park to the park system and national strategy. The reader is urged to keep in mind that the procedures could follow the reverse order just as well. But, if plans are to be prepared for over one hundred parks in Latin America in one or two decades, they will have to be prepared in great part by area managers. It is essential, therefore, that they initiate this effort at their level of greatest familiarity.

The reader is also urged to keep in mind that while this and subsequent chapters focus specifically upon national parks, society requires a range of benefits which can only be realized through the management and development of an organized system of wildland conservation areas. National parks alone are not sufficient. Plans must also be made for the conservation units, systems and strategies of the other wildland categories (the national forests, wildlife sanctuaries, etc.).

The Planning Method in General Terms

The suggested planning method for national parks has two objectives: First, to provide a fundamental guideline for planning the management and development of specific resources in particular geographic locations (park areas); and second, to provide a fundamental guideline by which the planning process can become a normal function of a national park organization.

In Chapter III, a ten-step model was presented and discussed in fundamental terms to explain the procedure for planning. The planning method for national parks will now be considered in somewhat greater detail. There are three PHASES which are in turn sub-divided into fourteen STEPS:

Phase One -- Preparation of the Plan

1. Gather basic information and background
2. Inventory the area in the field
3. Analyze the limitations and constraints
4. State the objectives of the park
5. Divide the area into management zones
6. Draft the boundaries for the area
7. Design the management programs
8. Prepare the integrated development program
9. Analyze and evaluate the plan
10. Design the development schedule

Phase Two -- Publication and Distribution of the Plan

11. Publish and distribute the management plan

Phase Three -- Implementation of the Plan

12. Implement the plan
13. Analyze and evaluate the results
14. Gather feedback and revise the plan (replan).

Each of the fourteen steps is related and dependent upon all other steps. What affects one step will most certainly affect the others in one way or another. For example, consider a hypothetical case where a planning team has taken the decisions related to Steps 1 through 7. The team now faces the eighth step -- prepare the integrated development program. To their surprise, they find that the developments which follow from their earlier decisions are exaggerated and unacceptable. The members of the team feel that there are too many buildings, too much pavement, too little protection of critical natural areas, and the implied budget is beyond the reach of the park department. Some members may be uncomfortable due to their concern that the plan may not be leading towards the objectives. Some may argue that there is over-development, while others will claim the plan to be too primitive and unimaginative.

The arguments may be strong as the team members return to previous steps to search for errors and conflicts. What is critical, however, is that everyone is arguing about a model which thus far has been drawn only on paper. The bulldozers have not yet touched the resource. The decision is in abstraction with no risk to the national heritage.

As shown in the diagram in Figure V-1, the planning team moves from step to step. When problems arise, the team may retrace its steps and rework previous decisions. The ability to retrace and relocate earlier ideas is of utmost importance since many planning errors remain uncorrected because planners cannot recall the reasons for which they made decisions yesterday. What values influenced their judgement? Maybe their previous questions were at fault, but what were those questions?

In theory, all steps in this kind of decision model are taken virtually at the same time. The model is a single process in which each answer to a question leads to the following question, which when answered again leads to the following question, and so on. In practice, it works much more slowly. The planning team will often require hours, days or weeks to make decisions.

This difference between theory and practice is caused principally because of the many unknown factors which affect park planning. Actually, little is known about the nature and function of natural and cultural resources. And, even more complex, little is known about humans, their behavior in wilderness, their needs for the diverse benefits from natural and cultural resources, and their interrelationship with other humans in wildland areas.

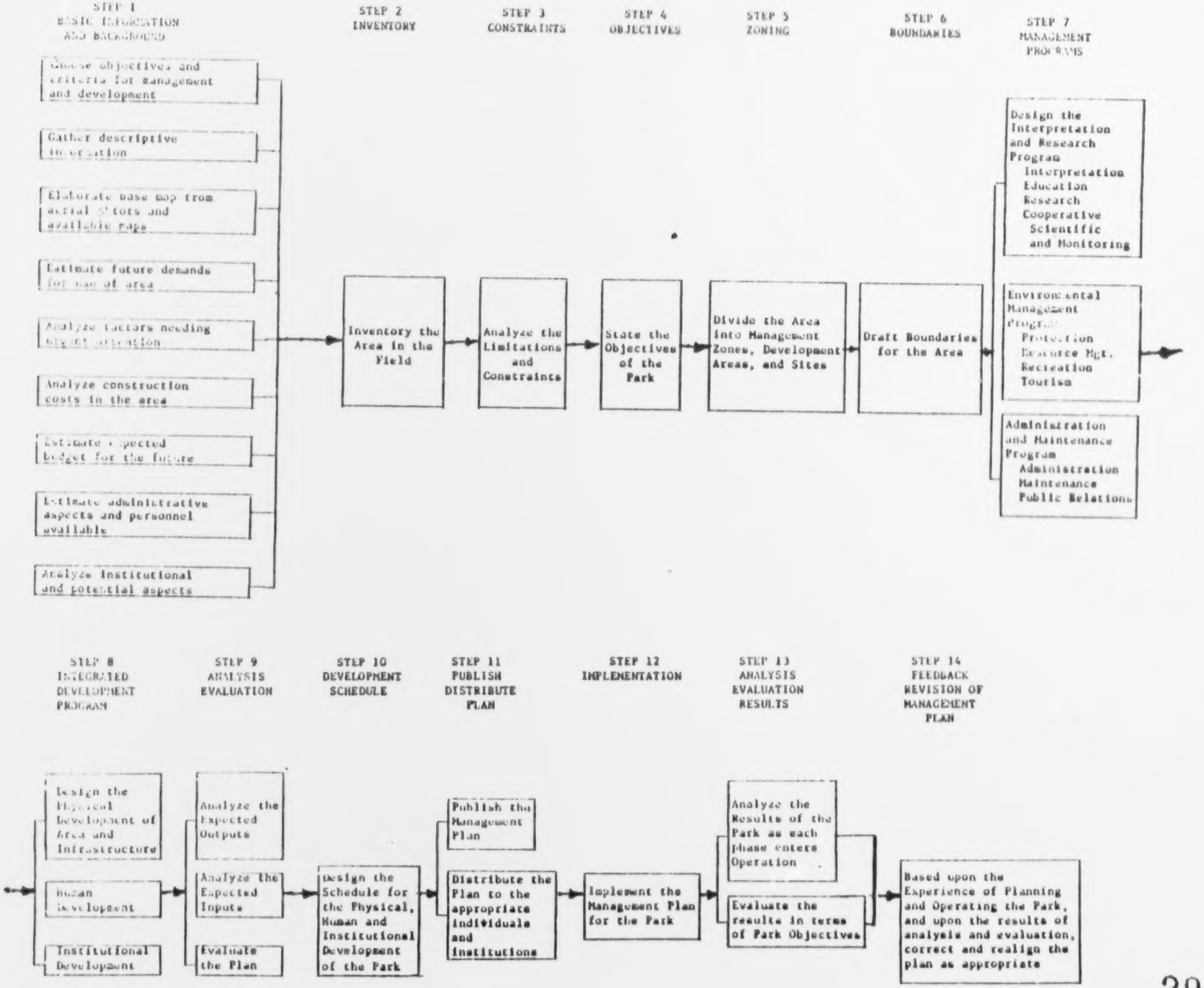

STEP 1
BASIC INFORMATION AND BACKGROUND
Choose objectives and criteria for management and development
Gather descriptive information
Elaborate base map from aerial photos and available maps
Estimate future demands for use of area
Analyze factors needing urgent attention
Analyze construction costs in the area
Estimate expected budget for the future
Estimate administrative aspects and personnel available
Analyze institutional and potential aspects
STEP 2
INVENTORY
Inventory the Area in the Field
STEP 3
CONSTRAINTS
Analyze the Limitations and Constraints
STEP 4
OBJECTIVES
State the Objectives of the Park
STEP 5
ZONING
Divide the Area into Management Zones, Development Areas, and Sites
STEP 6
BOUNDARIES
Draft Boundaries for the Area
STEP 7
MANAGEMENT PROGRAMS
Design the Interpretation and Research Program
Interpretation
Education
Research
Cooperative Scientific and Monitoring
Environmental Management Program
Protection
Resource Mgt.
Recreation
Tourism
Administration and Maintenance Program
Administration
Maintenance
Public Relations
STEP 8
INTEGRATED DEVELOPMENT PROGRAM
Design the Physical Development of Area and Infrastructure
Human Development
Institutional Development
STEP 9
ANALYSIS EVALUATION
Analyze the Expected Outputs
Analyze the Expected Inputs
Evaluate the Plan
STEP 10
DEVELOPMENT SCHEDULE
Design the Schedule for the Physical, Human and Institutional Development of the Park
STEP 11
PUBLISH DISTRIBUTE PLAN
Publish the Management Plan
Distribute the Plan to the appropriate individuals and institutions
STEP 12
IMPLEMENTATION
Implement the Management Plan for the Park
STEP 13
ANALYSIS EVALUATION RESULTS
Analyze the Results of the Park as each phase enters Operation
Evaluate the results in terms of Park Objectives
STEP 14
FEEDBACK REVISION OF MANAGEMENT PLAN
Based upon the Experience of Planning and Operating the Park, and upon the results of analysis and evaluation, correct and realign the plan as appropriate

Figure V-1. Schematic diagram of the suggested method for planning the management and development of National Parks.

The planning team is forced to consider many ideas and concepts which are still unproven, notions which still lack evidence, and it must work from deep personal feelings and conviction about human values and those evasive "long-run benefits." Far different from any mechanical process, park planning depends upon the *judgement* of the members of the planning team.

It is suggested that the planning team study and grasp each step before proceeding to the next. Once team members feel familiar and comfortable with each, they should try them in order, one after another, and begin to *feel* the planning process. Figuratively speaking, they are in a similar situation to the juggler who, one by one, throws each ball into the air and attempts to keep all of them there, in motion, until he is ready for them to fall into place in an orderly manner.

Step 1 -- Gather Basic Information and Background

The planning process begins in the office. Before running out to the field, where admittedly most of the work and pleasure lie, a certain amount of homework must be done. The reasons for considering the area as a national park must be understood in terms of national conservation objectives and in relation to the national park system plan if such has already been prepared. Descriptive information on topography, geology, and flora and fauna and archeological and historical sites and objects are gathered from libraries and other sources. The National (or Regional) Development Plans are read in terms of their relationship to the geographical region of interest and the related sectors such as education, science, recreation, tourism, road construction, etc. Then, there is a need for data on the use of wildland resources and on the costs of various types of construction in the area. Past departmental and ministerial budgets and lists of personnel are reviewed to gain a perspective on trends and expectations for the new park. And careful consideration is given to other agencies' plans for the same area, as well as to policies, laws and institutional factors which may influence the park plan.

The park planning process begins with a thorough review of knowledge about the area and of the factors which will affect the planning of the park. This information also supports the preparation of a BASE MAP which should be ready before the team heads for the field.

Step 2 -- Inventory the Area in the Field

With BASE MAP in hand, and the necessary equipment and supplies, the planning team heads for the field. Although the content and intensity of the inventory may vary considerably, all park planning will require some field work to gather new information, check and update existing data and to review the area with new perspectives. Generally, a review is made of the geology, flora, fauna, water resources, weather and genetic materials. Attention is also given to archeological artifacts and sites, as well as to contemporary cultures. The regional influences upon the park are studied to note economic pressures, colonization, hunting, pollution, or other effects. Transport networks, communications and other aspects of human settlement are examined, and the trends and attitudes of local citizenry are noted.

Particular attention is given to CRITICAL AREAS such as unique natural phenomena, sites of poor drainage, endangered species and their habitats, or other factors which can have an over-riding influence on planning.

All data from the inventory are noted in field notebooks. Information on natural and cultural resources are located on the BASE MAP.

Step 3 -- Analyze the Limitations and Constraints

From the office work and field inventory it will be apparent that there is a growing list of constraints upon the management of the area. For physical, environmental, institutional, political, economic, or legal reasons, there are limitations on what can be done. Not all of the doors are open! Some options have been removed or severely challenged because of what nature, or past or present man, has done before the planning team arrived on the scene. There are FACTS which can be objectively stated and there are ASSUMPTIONS consisting of unwritten but well accepted guidelines of policy, or statements of what the planners believe to be management guidelines but which are never discussed officially. The planners already have some standards and norms concerning construction codes, public health, visitor density patterns and pollution control.

These limitations and constraints are to be made explicit. They reduce the options or guide the decisions of the planners. Since such guidelines change and evolve with time, the planners must be able to recall which doors they thought were open in the event that later events show that one or more doors were in fact closed.

Step 4 -- State the Objectives of the Park

Steps 1 through 3 have provided the basis by which the planners can now consider in greater detail the role and potential benefits of the park. In Step 1, general statements of objectives for the park were made to orient the initial gathering of information. By the end of Step 3, the information exists to specify objectives in greater detail. For example, from the original statement: "maintain representative samples of major biotic units as functioning ecosystems in perpetuity," the objective may now be more specified: "maintain a representative sample of the 'Guayana Highlands biotic province'."

Subsequent steps will have to consider the means for maintaining such a sample as a "functioning ecosystem" in light of the characteristics of the resource and the need for other wildland outputs from the area. and as a functioning ecosystem "in perpetuity" in light of legal, institutional and political factors, land use trends, and the like.

Step 5 -- Divide the Area into Management Zones

The team now enters into the most significant of decisions. The park area is sub-divided into ZONES -- sectors of the park which require similar management practices to meet particular objectives of the park. Each zone has one or more sub-objectives, a definition, a description, and norms for management.

Then the ZONES are sub-divided. Specific areas within ZONES are identified by the planning team as DEVELOPMENT AREAS -- the places where small or large amounts of man-made capital will normally have to be added to the natural or cultural resources to permit particular scientific, recreational, educational, touristic or protection activities to take place. Each DEVELOPMENT AREA is assigned a name, a theme (very specific goal), and a general set of facilities and services. Within each AREA, specific SITES are identified where actual management practices, activities and physical developments are to be located.

The zoning proposal (including development areas and sites) is placed on the PRELIMINARY ZONE MAP and represents the first draft model of the park which shows how the park will function.

Step 6 -- Draft the Boundaries for the Park

Theoretically and ideally it is at this point when the planners are ready to consider the boundaries for the park. Admittedly, boundaries will have been assigned to most parks before planning begins. However, the team should be free to reconsider the boundary and to propose modifications as necessary.

The BASE MAP has information on topography, flora and fauna, ecological features, CRITICAL AREAS, regional influences, transport and communication installations, land use, human settlement and historic sites. In addition, the planners now have a PRELIMINARY ZONE MAP based upon specific objectives for the park which have taken into account both the resources of the area and the potential role of the area in regional and national development and conservation. The task is then to sketch the boundaries around the exterior of the zones. The boundary considers the land and water area necessary to meet the objectives. The proposed line is placed on the PRELIMINARY ZONE MAP.

Step 7 -- Design the Management Programs

The zoning concept has provided the basis for deciding what is to be done where. Each zone has a job to do as part of the overall park. The questions now turn to getting these many jobs accomplished: How will things be done? By what means will the objectives be attained? Who will do them? The planning task becomes action-oriented.

MANAGEMENT PROGRAMS are designed to address the key action topics: ENVIRONMENTAL MANAGEMENT, INTERPRETATION AND RESEARCH, and ADMINISTRATION AND MAINTENANCE. Each PROGRAM has several sub-programs on particular types of activities such as research, recreation and staff training. For each SUB-PROGRAM, the team prepares a MANAGEMENT CONCEPT: a statement of objectives, a list of activities, standards and norms, the requirements for personnel, and the construction, supplies and equipment needed to put each sub-program into action.

Step 8 -- Prepare the Integrated Development Program

The analysis on zoning and the management programs establishes the needs for man-made inputs to the natural or cultural capital. Given what is already there, and considering what activities the team believes should be available in the park, what ingredients are missing?

The physical development requirements are now located on a clean copy of the base map. This GENERAL DEVELOPMENT MAP will show the zoning, development areas and boundaries (transferred from the preliminary zone map), the suggested buildings, roads, communications, and other types of construction. The GENERAL DEVELOPMENT MAP represents a single statement of the physical developments required to accomplish the various management programs. In addition, there are the requirements for development of human capacity to manage the park. Training courses, scholarships, in-service experience to be gained at other functioning parks or participation in an international seminar are all potential tools to be considered for preparing personnel for the job being designed. Also important are the institutional aspects of development which require activities in law, policy, institution building and inter-agency relations as well as community and public relations.

Step 9 -- Analyze and Evaluate the Plan

The MANAGEMENT PROGRAMS and the INTEGRATED DEVELOPMENT PROGRAM present a pragmatic statement of one alternative way to approach the objectives of the park. First, the proposed activities, physical facilities, personnel requirements and institutional innovations are analyzed to check if they, in combination with the natural and cultural resources, are in fact capable of yielding the objectives. Second, even if they are capable, are they appropriate and acceptable? Why do them at all?

If the package is accepted by the team, the planning procedure moves on to step 10. If rejected, then further search for inconsistency and inappropriateness is made until a new and better alternative is designed. This may require returning to Step 1 and repeating the entire procedure again.

Step 10 -- Design the Development Schedule

The previous steps have established a plan which states: *What* is to be done *where*, *how* and *why*. Furthermore, the plan states *who* will do the work and with *what kinds of resources*.

Now, before the plan is allowed to gel, there remains the question of *when*. The team must decide upon the timing of each event in the plan by designing a DEVELOPMENT SCHEDULE. When the elements of the integrated development program can be scheduled to make sense, then the team can consider their work to have presented a viable PLAN.

Step 11 -- Publish and Distribute the Management Plan

The elements of the PLAN are now available. The PLAN will have limited usefulness, however, unless it is published in a form designed to reach a particular or general audience. The planning document must be distributed to make sure that copies get into the right hands.

Following approval of the document by the Department Director and Minister, the planning team ensures that copies of the document arrive into the hands of all members of the cabinet, related government departments and institutes, universities, national and international conservation bodies (particularly the IUCN and WWF) and related OAS and UN agencies and departments. In some cases, the regional banks and economic integration bodies will be interested in, and make good use of, such plans in regional development work.

Step 12 -- Implement the Plan

The planning process continues. The job is not terminated when the PLAN is published. Some team members must be involved in the implementation of the plan to help get it off to a good start. They must ensure that the plan can be understood and followed by all concerned with implementation. Since the manager of the park and several rangers and other personnel were members of the planning team, they should be prepared to carry the responsibility of the planning process on into implementation.

Step 13 -- Analyze and Evaluate the Results

Careful control must be maintained on the implementation of the plan. This can be accomplished by field personnel and through periodic visits by other members of the team (architects, engineers, ecologists, the director, etc.). The results of each aspect of the plan must be analyzed and evaluated in terms of the implications for achieving park objectives.

Step 14 -- Gather Feedback and Revise the Plan (Replan)

The area manager and other team members, and in fact all park personnel, are to be sensitive and aware of as many problems of management and development as possible. The staff are all part of the "monitoring system" which must identify problems as quickly as possible and initiate the appropriate corrective action. Each staff member is to have the plan in his mind, and a copy handy for daily consultation. All eyes and ears must gather information as to how the plan is working.

The Planning Method in Detail

The planning method for national parks will now be presented and discussed in greater detail. The individual items are brought forward in the order at which planners generally need to consider them. A check list of the key questions of the planning process appears in Appendix V-A.

Generally, the members of a park planning team will face one of three common situations. They will be assigned to prepare plans for areas which have been legally established and have extensive and rudimentary programs of management and development under the responsibility of small groups of park rangers. Most parks are in this situation. A second group of parks includes those which have been under management and development for many years without a formal plan. Normally, these older parks have developed many inconsistencies which eventually need to be rationalized. And finally, there is the ever more frequent situation where new areas are being considered for establishment as national parks. In this third case, proposals are needed for boundaries and programs for each area.

Conceptually, the questions to be asked in each of these typical planning situations are similar. The emphasis given to particular aspects of the planning problem will vary, however, primarily due to the increased level and quality of information and experience which comes with personnel already in the field, and the number of options already closed due to previous developments.

The presentation of the planning method will reflect upon these various circumstances. Examples from experience in Latin America will illustrate common problems and the solutions which have been employed.

Pre-Field Activities

Before heading off to the field, and prior to gathering together all sorts of data, maps and individuals to do planning, there are several activities which must be done:

First, a room within the park department must be chosen and furnished to house the planning effort. Of particular importance, the office must be available at all times for the permanent use of the planning team during the exercise, and be in a quite undisturbed location. The furnishings should include a large table around which the team can work, meet, read maps and finally put together the planning document. A file cabinet should be organized to hold the information to be gathered on the park, preferably with file folders by theme, placed in order of the various chapters of the plan (to be discussed below). A map file should be set up to hold the topographic and other maps of the area, the BASE MAP and other originals and copies to be made.

A stereoscope (either table model or pocket model) is necessary to read the aerial photographs of the area to be studied. The photographs can be filed in the file cabinet. A book shelf is important for keeping readily accessible copies of the national development plan, regional and sectorial plans, and various reference books on national parks, park planning, architectural and engineering standards, plant and animal keys, etc.

And, a 35 mm. projector and screen are useful to enable the team members to review quickly the transparencies of the area which they bring back from field work, or borrow from mountaineers, botanists, or other knowledgeable individuals on the area. The slides can be efficiently filed in the cabinet in plastic sheets[4] made for that purpose or in flat boxes according to the practice of the department.

Second, the planning team must be established. Normally it is the director who names the individuals to serve as planners during a specified period. Several factors are taken into account: Certain professions are required to cover themes related to the area (geology, botany, marine biology, archeology, etc.); particular institutions are related to the planning exercise due to their focus or expertise (soil conservation, water resources, national or regional planning, tourism, culture, etc.); the personnel of the park department assigned to the park or to regional offices are generally most familiar with the area and with the objectives and concepts of national park management; and, individuals from institutions with neighboring or overlapping jurisdiction and authority or common interests generally possess unique and complimentary experience and authority in the local context (officers from municipal, state or provincial and county government, tourism bureaus, automobile or mountaineering clubs, agricultural cooperatives, forest industry, or regional water boards). Occasionally, there are unaffiliated individuals who are outstanding experts or highly knowledgeable on the area and warrant inclusion on the team (mountaineers, guides, anthropologists, prospectors, etc.).

Third, a table of contents and list of figures and tables for the planning document are prepared. These guides are relatively constant for each park, and once prepared, can serve for virtually all planning exercises. A basic table of contents and a list of figures and tables are presented in Tables V-1 and V-2.

Fourth, a work plan is prepared. From the steps in the planning method shown in Figure V-1, and the table of contents and list of figures and tables for the planning document shown in Tables V-1 and V-2, the team can prepare a list of the major activities to be realized. The team can then divide the responsibilities for work among its

TABLE V-1

MANAGEMENT PLAN

Table of Contents

Preface

List of Figures and Tables

List of Appendices

INTRODUCTION Location, legal description and brief overview of the area and the motivation for its study

CHAPTER I -- NATIONAL AND REGIONAL BACKGROUND

- National Context
  - National Objectives for Conservation
  - National Strategy and System for Conservation Units
  - Biogeographic Regions and Provinces
  - National Transportation System

- Regional Context
  - Biophysical Features
    - Topography
    - Watersheds and Drainage Patterns
    - Water
    - Climate and Weather
    - Geology
    - Soils
    - Vegetation
    - Fauna
    - Fire (or other major natural influence)
    - Critical Areas

  - Cultural Features
    - History
    - Archeology
    - Anthropology
    - Contemporary Culture
    - Art, Literature and Music

  - Socio-Economic Features
    - Regional Economy and Land Use
    - Demographic Characteristics
    - Regional Transportation System
    - Tourism, Recreation and Existing Infrastructure

TABLE V-1 Continued

CHAPTER II -- ANALYSIS OF THE CONSERVATION UNIT

- Biophysical Features
  - Topography
  - Watersheds and Drainage Patterns
  - Water
  - Climate and Weather
  - Geology
  - Soil
  - Vegetation
  - Fauna
  - Role of Fire (or other major natural influence)
  - Critical Areas and Special Considerations

- Cultural Features
  - History
  - Archeology
  - Anthropology
  - Contemporary Culture
  - Music, Literature and Art

- Socio-Economic Use of the Area
  - Present Land Use
  - Trends in Land Use
  - Use of Area by Visitors
  - Analysis of Visitors

- Statement of Significance

CHAPTER III -- MANAGEMENT AND DEVELOPMENT

- Objectives

- Limitations and Constraints

- Management Zones
  - Intangible (Scientific) Zone
  - Primitive Zone
  - Extensive Use Zone
  - Intensive Use Zone
  - Cultural Zone
  - Natural Recovery Zone
  - Special Use Zone

- Boundaries

- Management Programs
  - Environmental Management
  - Interpretation and Research
  - Administration and Maintenance Program

TABLE V-1 Continued

Integrated Development Program
    Development Areas
    Personnel Development
    Institutional Development
    General Development Map

Development Schedule

APPENDICES

TABLE V-2

MANAGEMENT PLAN

List of Figures and Tables

Location Map of the Park

Biogeographic Map of the Nation

Regional Context Map

Present Land Use Map

Specifications for the Management Zones

Specifications for the Development Areas

Organization Diagram for the Park

Numbers and Kinds of Personnel Required for the Park

Physical Developments Required and Their Respective Costs

Development Required for Personnel

General Development Map

Development Schedule

Development Schedule Map

Budget

members, noting the respective names on the work plan. A sample work plan is shown in Table V-3. Care must be taken to avoid dividing the team into the groups or individuals described in Chapter III. This division of labor is meant only to distribute the load of work during the office work of Step 1 and for secretarial functions during subsequent steps.

Step 1 -- Gather Basic Information and Background

The search for basic information and background can be divided into nine parts:

First, relate general statements of objectives for the park. At this early moment it is sufficient to write down the objectives for national parks, as noted in Table III-1, or those from the law which created the park. The objectives will become more specific later on.

Second, gather descriptive information on the park area. This can be usefully divided into three sub-headings:

Biophysical Features

Topography
Watersheds
Water
Climate and Weather
Geology
Soils
Vegetation
Fauna
Relationship of Fire
Critical Areas

Cultural Features

History
Archeology
Anthropology
Contemporary Culture
Art, Literature and Music

Socio-Economic Features

Land Tenure and Rights-of-Way
Trends in Land Use
Transport, Communications and other Infrastructure
National Development Plan
Regional or Sectoral Plan

As noted above in Chapter III, it is important to gather only that kind and amount of information which is necessary to answer the planning questions. However, information which is found to be unnecessary can be filed to form part of the basic documentation on the park since it may

TABLE V-3

SAMPLE WORK PLAN FOR THE PREPARATION OF A MANAGEMENT PLAN FOR A NATIONAL PARK

Step	Officer in Charge
Logistics	____________
1. Basic Information (office)	
a) Objective and Criteria	____________
b) Descriptive information	____________
c) Base Map	____________
d) Future Demands for Area	____________
e) Factors Requiring Urgent Attention	____________
f) Construction costs	____________
g) Expected Budget for Department	____________
h) Administration and Personnel	____________
i) Institutional and Political Aspects	____________
2. Inventory (field)	____________
3. Limitations and Constraints	____________
4. Objectives of the Park	____________
5. Zoning	____________
6. Boundaries	____________
7. Management Programs	
a) Interpretation and Research	____________
b) Environmental Management	____________
c) Administration and Maintenance	____________

etc...

serve subsequent studies. The information to be used in the plan should be summarized and written to inform the reader about the park.

Third, gather topographic information and prepare the BASE MAP of the park. Topographic maps of various scales are available for every square kilometer in Latin America. Exceptions lie in areas where cloud cover is so common that aerial photography has been incomplete. Modern radar techniques of aerial imagery, however, have now surmounted this problem, and maps can be made in spite of cloud cover. A set of aerial photographs in stereo pairs should be obtained of the area. In some cases, other types of photography such as those from the various satelite programs can be useful and are easily obtainable from the Eros Data Center, Sioux Falls, South Dakota U.S.A. Together, these maps and photographs, and possibly some additional maps from specialized sources (timber, mining, water resources, etc.) will provide the basis for the preparation of the BASE MAP. This map should be prepared at a scale of 1:25,000 or larger, or in any case, such that the entire park will fit onto a single sheet about 1 meter square. The information placed on the map should be kept simple: topography, physiography, coordinates, political boundaries, orientation to north, and a large open area around the margins for the legend and notes. An original BASE MAP should be made on heavy clear drafting paper from which 20 or 30 copies can be made. The original should be filed carefully in the map file.

It is important to follow and maintain a standard set of symbols for cartography such as those utilized by the OAS.[5] Additional symbols for park purposes will need to be developed and can be standardized for the department.

Fourth, analyze the use of the park area. Information is to be gathered on the past and present use of:

Timber (and wood products)
Water (power, navigation, potable, industrial, irrigation)
Fauna (meat, hides, fur and domestic)
Fish (meat, domestic, commercial)
Seeds (food, breeding, crops)
Minerals (mining, corals, precious stones)
Recreation and Tourism (local, vacation, international)
Shifting Agriculture
Employment (from activities in area)
Contemporary Cultures (living inside area).

Information is also to be gathered on those resources which can be expected to have important implications for park management. These will include mineral deposits, forests with merchantable timber stocks, obvious hydroelectric sites, alluvial soils, and peaks with prime locations for communications towers. These data are important in order to assess the advisability of including such resources within the park, and later, to prepare arguments for defending proposals to include or exclude the areas.

Fifth, explain the factors which require urgent attention in the park. A list will be made of those items which require urgent attention. Such a list may include problems like downstream flooding or other natural phenomena, resource destruction in the park by any source, the invasion of squatters into the park, social injustices and employment in the surrounding area, outstanding resources or endangered species about to be lost to an engineering project, recreation pressure or the need to boost foreign exchange earnings through tourism. Each item or problem should be examined to reveal its origin and relationship with the park. How does each item or problem affect the planning of the park? What can be done about it? These items and problems should give the planners a perspective of real-world context within which the park is being planned.

Sixth, analyze the costs of construction in the area. Most construction costs are quoted for urban areas or for the location surrounding the materials supply area. It is necessary to prepare a short list of construction costs which includes the additional transport charges for materials, equipment, and manpower to the site where the park will actually be developed. These adjusted (per unit cost) figures can be usefully noted on a table which will aid in estimating the cost of construction in later stages of planning.

Seventh, review budget status of the department and the prospects for the park. Review past departmental budgets and note the trends (growth, stable, decline). What are the expectations within the department? Note the percent of the budget going to each park already established. Estimate the general order of magnitude of budget which the new park may receive. Try to give optimistic and pessimistic guideline figures. Can the budget expected by the department absorb the cost of the new park? Has the new budget proposal included an estimate of cost for the new park? Or, will the new park have to be awarded a budget as part of the law for its establishment? This information gives the planning team a concept of the scale within which they are working.

Eighth, review the personnel status of the department and prospects for the park. Review the status of personnel throughout the department. Note the number of staff by the various categories of profession and skill class. From where will the staff required for the new park come? Transfer? New recruitment? Is the salary scale reasonable for staff to work in the park, or should efforts be made to rectify the salary scale now? How will the new staff be trained? Will they require special skills and traits because of the characteristics of the area? What needs to be started now to be ready then? Prepare guidelines on staffing the new park which will give the planning team a clear perspective on the magnitude of management capacity to expect.

Ninth, analyze the administrative, organizational, legal and political context for the new park. Can the administrative set up, as it now exists, handle an additional park? If not, what is needed to absorb new contracts, new activities and the additional work load? Is the department organized to supervise, control and implement the new plan? to incorporate and train the new staff or evaluate the existing staff? what about the regional, local and national offices? How will they interrelate with the new park? The legal context of the park should be carefully reviewed by the department legal staff. Will any new legal matters need to be developed for the park? New jurisdictions such as coastal and marine areas? The political context of the area is also critical. It is useful to interview the originators of the park proposal, local residents, near-by town residents and mayors, the provincial governor, and planning board officers. Who is for, and who is against the park proposal? Why? Who believes they will gain, and who believes they will lose? What are the issues? Guidelines should be prepared to give the team members perspective on sensitive issues.

The data gathered from the nine points of Step 1 should be organized in the file cabinet, as appropriate, according to the table of contents of the planning document suggested in table V-1. Some of the information will not be required for the actual publication, but may be necessary to give the planners certain perspective during the exercise. Some data may even be confidential in nature, and ought to be discussed and utilized accordingly.

Information on the physical resources (natural, cultural, and land use) can be usefully drawn on separate copies of the BASE MAP to give a VEGETATION MAP, ECOSYSTEM MAP, HYDROLOGY MAP, GEOMORPHOLOGY MAP, EXISTING LAND USE MAP, EXISTING INFRASTRUCTURE MAP, CULTURAL MONUMENTS MAP, or others, depending upon the resources and developments of the area.

One clean copy of the BASE MAP should be given to each planning team member for individual use in recording information and ideas for the section of the play for which he is responsible. The set of physical resources and development maps should be rolled and placed into a rigid waterproof tube for use in the field. Some five clean copies of the BASE MAP should be carried in the field for the elaboration of later planning decisions.

Each planning team member should have a field note book into which information, decisions and ideas can be recorded. It is expected the individual team members will be responsible for recording information and decisions according to the topics assigned on the WORK PLAN.

Based upon the information gathered and organized during Step 1, the team is now ready to look ahead to the field work.

First, the TABLE OF CONTENTS (TABLE V-1), LIST OF FIGURES AND TABLES (TABLE V-2) and WORK PLAN (TABLE V-3) are checked over to ensure that they are still appropriate in light of the data and preliminary conclusions gathered from Step 1. For example, the TABLE OF CONTENTS must reflect the kind of resources contained by the area being studied. Information from the office research may reveal that more cultural monuments are to be found in the area than originally suspected and therefore the document should give sufficient status and discussion to those resources. Then, there is the question of having the appropriate professions and individuals on the field team. Perhaps there is need of a historian, a land-use economist, a herpetologist. Furthermore, perhaps there will be a need to modify the representation of public and private institutions on the team. Perhaps the national automobile club warrants inclusion, the livestock growers association, the local newspaper. Finally, it is necessary to ensure that the assignment of responsibilities clearly reflects the anticipated work to be done. Thus, Tables V-1, V-2 and V-3 are revised and corrected where necessary as a result of Step 1.

The team next discusses the details and procedures for Steps 2 through 9, all of which are to be carried out in the field. Each team member must clearly understand the entire planning procedure, the details of his own responsibilities, and the relationship of his work to that of the other teammates. A good cross-check on this understanding and clarity is to reverse roles among the personnel. Each individual should be able to carry out (or at least explain) the task of any other member. While quite naturally each individual cannot possess the technical preparation of the others, such specialization should not bias the individuals into working as specialized individuals in the field. Again, "all business is everyone's business."

The team members are now in a position to paint for themselves a relatively clear scenario of their field work. They can refer to the mountains, the altitudes, the swamps, the potential camp sites, the climate, the problems of transportation in the area. They can now list their needs for field equipment and supplies (tents, cooking utensils, food for "x" days, horses and pack mules, boats, particular types of clothing and the like). In some cases, there will be a major change of climate and environment during the field work where the team travels from low humid forest to high mountain páramo. This may require a change of field equipment and supplies, clothing and types of food. In other cases, the team will cover arid coastlines on foot and then shift to boats for skindiving among coral reefs.

When all arrangements have been made and the team is confident that their plan is clear, it is important for the team to prepare and send (through the park department director) a briefing to the minister of agriculture or other related high-level officers. These leaders should be informed about who is going where to do what. Particularly relevant is to inform them about the inter-agency participation, the interdisciplinary nature of the work and the expected outcome of the mission. It is important to plant the seed now for an interview upon return from the field in order to present the preliminary results.

The team (including the park department director) may also wish to pay a quick visit to cooperating or related institutions to present a short briefing and also to present an interview with the local (and national) newspapers to ensure public awareness and information about the work.

Step 2 -- Inventory the Area in the Field

The basic concepts of inventory for the purposes of park planning have been discussed in Chapter III, and there are text books which describe in detail the methods and techniques for the inventory of particular aspects of natural and cultural resources. These methods and techniques vary from country to country. (For these reasons no attempt will be made to go into detail in this section.)

First, survey the natural and cultural resources of the area.

Individual resources will include:

Water and Watersheds
Climate and Weather
Geology
Soils
Vegetation
Fauna
Fire

At the same time, the survey will relate to:

History
Archeology
Anthropology
Contemporary Cultures
Art, Literature and Music

Second, survey the land use and development aspects of the area. Several aspects will receive attention:

Land Use (Percent and Trends)
Use of Area by Visitors
Analysis of Visitors

Special interest shall be given to agricultural uses, timber utilization, the use of water, fauna and vegetable products, and the use of the area for recreation and tourism purposes in the past and at present. The relationship of these and other activities to employment and demography are noted. During this process it is often feasible to gather information on the attitudes of local settlers on the concept of the park idea, their views of the land and resources, and of their own future aspirations. Care should be given to avoid culturally awkward or intruding methods of inquiry with local settlers.

The scenario of Step 2 includes the team members driving existing roads, hiking trails, flying over the area, climbing peaks, boating and canoeing or skindiving, to become as acquainted with the area as possible. They will camp generally in the wild area. They will speak with the local colonist or indigenous peoples with an attitude of learning from them whatever is possible about the area and its past. Evening conversations with the elders of the area can be most informative as well as build good human relations with the local citizenry. The scenario includes men drawing details of resource location on their maps, recording ideas and data in their field note books, and hours of discussion on the relative characteristics of the resources and land uses being viewed. There are moments when individuals are working and thinking on their own, getting their thoughts organized and data presented clearly. Then there are small groups comparing data and observations. Finally, there are moments when the whole team is together presenting information and discussing (and surely arguing and debating) the various resources and land uses.

The team leader's capacity is demonstrated where he can draw from the specialists their unique views, contributions and assessments of the resources and land uses, and yet, synthesize these back into an overview which integrates such information into a perspective of the whole area.

During Step 1, copies of the BASE MAP were used to sketch the location of particular resources. Notes were made on their quantity and quality and other characteristics. These maps and notes are now checked and revised according to the realities of the field. The forest may have been reduced somewhat since the latest aerial photograph flight was perhaps made some years ago. Again, it is generally useful to prepare individual maps for:

GEOLOGY (geomorphology, soils, etc.)
VEGETATION (forest types, life zones, communities, and more detailed characteristics)
FAUNA (communications, migratory routes, habitats, and critical elements for cover, food minerals, etc., and particular details on species of special interest)
CLIMATE AND WEATHER (temperature, rainfall, cloud cover, etc.)
CULTURE (monuments, archeological sites, existing contemporary groups and their territories, historic sites or routes, etc.)
LAND USE (sites dedicated to agriculture, livestock, timber, extraction of plant and wild animal products, water uses, etc.)
INFRASTRUCTURE (roads, trails, power lines, transmissions towers, canals, water works, etc.)

Some data will be most usefully presented on tables and figures, such as weather and climate, soils analysis, lists of species of flora and fauna, and chronologies of historic land use.

The maps, tables and figures should be numbered in order to provide each team member with a single organized system with which to refer to "Figure 3", or the "Vegetation Map."

Third, note the features of the national and regional development plans on the existing landscape. Current plans which were reviewed during Step 1, call for the construction of roads, a radio tower, a new source of potable water for the adjacent town, or a power line. The planning team must locate those projections in the field, examine their impact on the natural and cultural resources, and visualize them from the points of view of their benefits to society as well as their negative impact on the area. Some such proposals may have to be accepted as given; they are too involved with national security or development, or they depend too much upon a unique resource situation, to be disputed. But, many should be reviewed with an eye to suggesting alternatives. Transmission towers need not always be located on the highest mountain top in plain view of the entire area; highways can cross other areas outside of the park; often, hydroelectric dam projects are proposed with little consideration to alternative sites.

The location of such proposals should be recorded on the maps and discussion on their impact, appropriateness and degree of conflict with park management should be recorded in the field note books.

Fourth, sites which warrant classification as CRITICAL AREAS should be mapped and noted. Sites featuring poor drainage, seasonal flooding, instable soils and succeptibility to mass earth movements (avalanches, creep and slippage), erosion, wind, etc., should be located on the LAND USE MAP. Similarly, sites featuring endemic species, important genetic materials or endangered plans or animals must be mapped and recorded. Finally, those sites or existing infrastructure which feature problems which are ecologically sensitive, a hazard to human health or safety, or which are engineering problems, deserve special attention. Existing roads which may serve the park, but have dangerous curves, provoke land slides or down slope erosion, would be included among the CRITICAL AREAS to be noted. Others would include polluted water supplies, flash flooding streams, particular species of plants or animals dangerous to human visitation and other features which should influence planning decisions in the subsequent steps.

Step 3 -- Analyze the Limitations and Constraints

With the background information from the office now combined with the realities of the field, the team is prepared to discuss the limitations and constraints which should influence the park planning effort.

First, list the FACTS and ASSUMPTIONS which are thought to act as limitations and constraints upon the planning of the area. The FACTS generally consist of physical characteristics which limit or constrain the options open for planning. They are characterized by their immobility and irreversibility. For example, for all practical purposes, existing highways, power lines or water works are there to stay! What was considered to be virgin forest may have, in fact, been converted to agriculture; such an area can perhaps revert to forest, but it will not be representative of primary vegetation. Such FACTS can be presented as lines on maps to call the attention of later planning decisions to such relatively uncompromisable information.

The ASSUMPTIONS relate to limitations and constraints which are less fixed but nevertheless quite real to planning team members. They deal with factors which the planners believe to be true and important. For example, assumptions can be made concerning policies on land use or agrarian reform; on trends in demand for timber, water or recreation; or the expectation that the current plans for an international ecological monitoring program will be approved by the government. In addition, there are ideas and theories shared by the planners which reflect their suspicions and doubts: suppose that the current policies on the exportation of wildlife remain in effect, what will happen to this area? It may be supposed that budgets will not increase, that personnel ceilings will remain fixed, that international tourism will increase, etc., in spite of official policies and acknowledged trends.

The scenario of this Step is the group seated under a tree involved in discussion. They discuss the FACTS which are obvious to many. The ASSUMPTIONS are mentioned and those of most relevance to the planning exercise are noted. Individuals mention their concerns and doubts, the inconsistencies in data, policies, opinions and predictions.

Second, *prepare guidelines on the implications of each FACT and ASSUMPTION upon the planning of the park*. What is relevant is the effect of each upon planning. The best test for each limitation and constraint is simply to ask: "So what?" What does that mean to us (the members of the planning team)? How does that change our work, effect our decisions, alter our perceptions?

Remaining under the tree (so to speak), the team proceeds on to the next step.

Step 4 -- State the Objectives of the Park

The team has already reviewed the national development plan, the existing and potential land use, and the general conservation objectives (from Table III-1). The objectives can now be refined:

First, *formulate specific objectives for the park*. The park must be managed to meet specific goals: to maintain a representative example of the "Brazilian Araucarian Forest Biological Province;" to maintain the ecotones characteristic of the oxbow lakes of the upper Amazon Basin; to maintain the genetic resources peculiar to high-Andean mountain lands; to provide educational services on desert lands; to provide recreational services in a marine environment; to support rural development through tourism based on superlative scenery. These objectives must now relate to *this* area, not to parks in general.

Second, *(as far as possible) word the objectives such that they can guide management decisions, and subsequently, management decisions can be evaluated*. The objectives must be stated so as to provide management with a series of mandates which are clearly related to the area and its resources. They are of little use if they appear abstract and distant. And, later on, it must be possible to return to these objectives and ask, "Have they been met?" Is the representative sample of the "Brazilian Araucarian Forest" being maintained as a functioning ecosystem on a perpetual basis? Is tourism really supporting rural development, or hurting it? These are the tough questions to come up in Step 9, and also during annual review missions by the ministry and planning board. The statements of objectives provide the meter sticks and calipers for measurement.

The objectives are written in the field note books.

Step 5 -- Divide the Area into Management Zones

The study area is familiar now to the planning team due to their office work (Step 1) and the field work to date (Steps 2-4). Essentially, the team knows of what the resources consist, of the limits to those resources and their use, and the objectives to which the resources are to be devoted.

The task turns now to dividing the study area into ZONES, which when provided with the necessary protection, administration, interpretation, maintenance, research and the like, will be capable of meeting the objectives of the park. In Chapter III, the fundamentals of zoning were explained. Strategies and tactics were derived to guide planners through the problems of relating areas and activities to objectives. These guidelines should be kept clearly in mind and a copy kept handy for reference in the field (as per Appendix V-B).

First, (with the help of the resource maps and the field notes from Steps 1-4) identify areas where the natural and cultural resources relate to the individual park objectives:

a) the representative samples of biological provinces;

b) the ecological transitions, lake and river shores, swamps, coastlines and places related to ecological diversity;

c) the places related to endemic, unique or rare species and their habitats;

d) the places related to cultural heritage (including contemporary peoples, structures, objects, sites, historical environments, etc.);

e) the areas particularly related to education and interpretation, to research and monitoring;

f) the areas of outstanding scenic beauty;

g) the areas of particular potential for recreation and tourism;

h) the areas particularly related to rural development;

i) the watersheds of particular relevance to water production in the region; and

j) the areas susceptible to, or already in, accelerated erosion.

Second, sketch each of these ten particular areas, sites or points onto a clean copy of the base map, to be called the PRELIMINARY ZONE MAP.

Third, (from among the ten areas, sites or points) identify five preliminary zones, comprised of:

a) areas capable of addressing the objectives related to the maintenance of the representative sample(s), the ecotones and the key genetic materials;

b) areas capable of addressing the cultural heritage objectives;

c) areas capable of addressing the objectives related to recreation, tourism and the maintenance of the outstanding scenic resources;

d) areas capable of addressing the education, interpretative, research and monitoring objectives; and

e) areas capable of addressing objectives related to rural development, water production and erosion control.

Parts of these five preliminary zones will overlap, that is, some resources will be capable of addressing more than one objective. Parts will consist of large areas in the hundreds or thousands (or tens of thousands) of hectares, while others will be small or involve only points of the land or water surface. The points of interest for interpretation and monitoring will generally lie within other preliminary zones. Where two or three objectives can be addressed in a particular place or area, there may be competition for the use of the natural or cultural resources. One of the challenging tasks of zoning is to determine whether there is competition, and if so, to seek relative harmony.

Fourth, check the preliminary zone which contains the representative sample(s), ecotones and key genetic resources, in relation to the tactical guidelines. The preliminary zone should circumscribe a representative sample of the biological province(s) of interest. The zone should be sufficiently large and have the appropriate shape to contain those resources necessary for sustained survival of the ecosystems. The institutional aspects (law, policy, etc.) and management capacity should be capable of guaranteeing that the representative sample can be perpetually available in its natural state. The zone must include samples of the ecotones between the representative sample and adjacent biomes, provinces, and life zones. Furthermore, a variety of features, sites and phenomena necessary to ensure self-regulation must be included. Sites of endemism, critical habitats and rare and endangered species are included. And, when possible, the zone must include the range and habitat requirements of the species present in the representative sample.

Each tactical factor is considered and discussed with the various members of the planning team. The preliminary zone lines are corrected as appropriate on the PRELIMINARY ZONE MAP. The lines should be kept light and in pencil since they will be relocated many times during the zoning analysis.

Fifth, check the preliminary zone which contains the cultural resources in relation to the tactical guidelines. The preliminary zone should provide for a blending of natural and cultural resources such that an appropriate scenic backdrop is provided for the cultural subject.

Those cultural resources which are scattered in relatively low densities within the other preliminary zones will be dealt with later as parts of those zones. Any cultural structures, monuments, objects or historic environs which are found to lie outside of the cluster of preliminary zones should be incorporated by either (a) extending the nearest preliminary zone to include the cultural site or (b) circling the area on the PRELIMINARY ZONE MAP as a non-contiguous cultural zone of the park. Examples are shown in Figures V-2 and V-3.

Again, the lines on the map are corrected.

Sixth, check the preliminary zone which contains the areas and points of interest for education, interpretation, research and monitoring. Particular areas must be designed and managed for interpreting the natural and cultural heritage to the general public, and the education and training of organized groups. Research and monitoring are required to support the management of the park and rural development, for the training and education of scientists, students, planners and engineers, and for the preparation of education materials. It is difficult to predict where the many points of interest will lie. The challenge is not to define what the scientists, interpreters, and managers will wish to study, monitor, and interpret, but to provide for the options. It is clear that the plant and animal life, geology and history of the area will be interpreted for the park visitors. The scientist and managers will be interested in such aspects as plant succession, stream flow, volcanism, weather, agricultural pests, and the like. Some areas will be utilized on a temporary basis and need only involve portable equipment. Some areas can serve for education, interpretation, research or monitoring along with other park activities. But, there are those activities which require stable, long-term and exclusive use of natural or cultural resources. These areas may require some installations and buildings as well as access and services on a permanent basis. Examples are shown in Figure V-4.

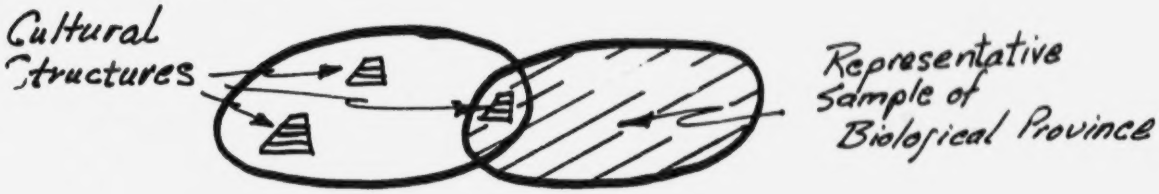
Three different types of requirements should be indicated separately on the PRELIMINARY ZONE MAP:

a) areas which are of particular importance for permanent or long-term use on an exclusive use basis;

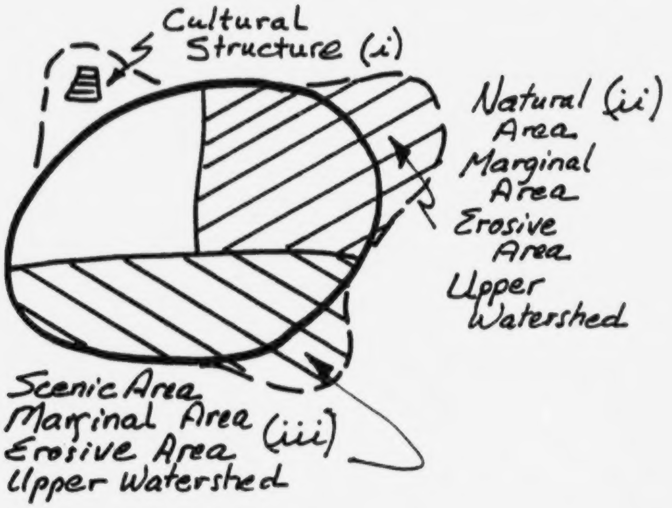
b) areas of interest for temporary or intermittent use; and

c) areas which can be utilized in conjunction with other activities, such as recreation.

Seventh, check the preliminary zone which contains the outstanding scenery and the resources related to recreation and tourism. The preliminary zone for recreation and tourism should include sites,



a) Where an area is capable of addressing several objectives:
  i) the area shall be devoted to the most critical or important (dominant) objective consistant with the particular circumstances;
  ii) the secondary objective can still be met, but under the constraints of the dominant objective.



b) Where an area of importance to park objectives is near but not within preliminary zones, such as that shown at (i), (ii) or (iii), the boundaries can be extended to include such areas.

c) Where the boundary cannot be extended to include nearby areas of importance to park objectives, (i, ii, or iii), such areas should be designated as non-contiguous sectors of the park (satelite sectors). (See example in Figure V-3.)

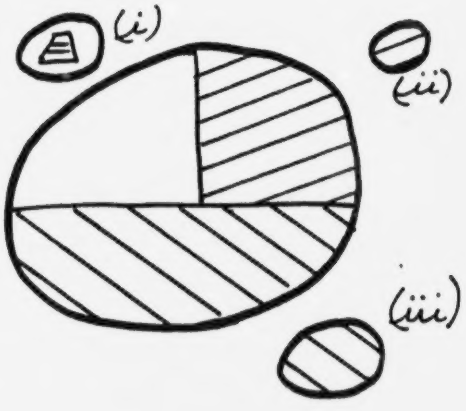


Figure V-2. Guidelines for resolving some normal conflicts in zoning.

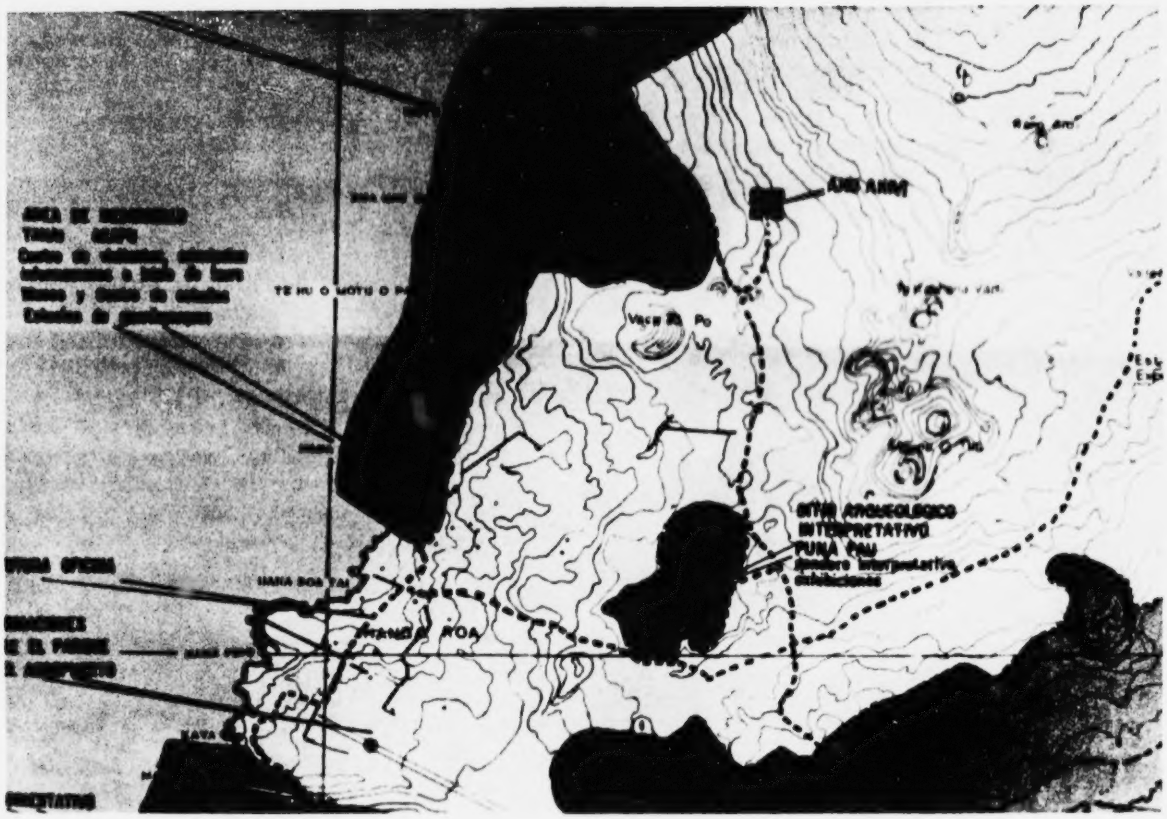


Figure V-3. Rapa Nui National Park (Easter Island), Chile, showing the design of non-contiguous or "satelite" sectors of the park.

Figure V-4. Torres del Paine National Park, Chile, showing the tourism villa set apart from the park. Note the administrative headquarters, research laboratory, small hotels and ranger stations.

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features or areas which possess outstanding scenic qualities or are characteristic of the landscape in that particular part of the nation. If the scenic resources lie outside of the cluster of zones thus far identified, an attempt should be made to extend one or more of the zones to engulf the scenic resources into the park and ensure their adequate protection. The technique shown in Figure V-2 for cultural resources can serve for scenic resources.

Sectors of the park must now be chosen where visitors may come to explore, enjoy and learn to understand their natural and cultural heritage. This implies that facilities and services must be provided and that land and water areas must be dedicated to meet these objectives.

It is important to note and separate those recreational services which require minimal as opposed to major, alterations in the natural environment. Such activities as wilderness hiking may be quite compatible with scientific research and monitoring. Such activities as picnicking may be compatible near the areas which feature interpretative walks in natural and cultural areas.

Alternatively, where tourism is to be considered as a major activity involving large investments in overnight facilities and infrastructure (parking lots, gasoline stations, motels, food service, garbage disposal, etc.), it is advisable generally that the team search for appropriate development areas outside the park. Perhaps tourism installations can be placed along the exterior edge of the park near the entrance gate, or alternatively, several kilometers distance on a scenic lakeshore. See the example in Figure V-3. The visitors could enjoy the park during the day and return to the tourism villa at night. In occasional cases, it is advisable to include small-scale overnight units inside parks because of the problems related to isolation, inclement weather and difficult access. The effects of such installations inside the park will require careful buffering from areas of particular importance to monitoring, research and nature conservation. The zoning must reflect these considerations.

In cases where the park is to be utilized for both international tourism and local recreation, it is important to take account early of the possible different requirements of the two groups. Perhaps the groups warrant separate areas because of their contrasting life styles and recreation activities. Alternatively, national policies may suggest that all recreation and other public developments be designed to promote social integration, and the international and (the various) national groups may be expected to recreate side-by-side.

These considerations will certainly have provoked fresh ideas and the team will wish to revise the zone lines on the PRELIMINARY ZONE MAP.

Eighth, examine the areas and points of the park which are of direct relevance to rural development. Within the territory of the park study area there are resources which are intimately related to the welfare of the rural people.

a) Upstream catchments, steep terrain, and erosive areas susceptible to accelerated erosion should be included within any of the five preliminary zones.

b) Marginal lands still in wild or semi-wild states should be integrated into any of the zones.

c) Any of the preliminary zones should be extended to incorporate nearby catchments, steep areas, erosive and marginal lands. The technique show in Figure V-2 will serve.

A second dimension is then considered: Because of the park, many alternative uses of the resources will be generally discarded as inappropriate. For example, there will be potential highway routes, mountain peaks for telecommunications towers, sites for hydroelectric dams, timber and mineral resources and gravel deposits. When the team draws lines on the PRELIMINARY ZONE MAP, they have *de facto* excluded these development opportunities from the rural people.

In Step 1, the plans for future roads, towers, dams, and the like were noted from the various government planning documents.

d) Compare all projected developments with the preliminary zones. If the park proposes to include such projected developments or any of the mentioned alternative uses of resources, then the team must decide to:

i) exclude the area from the preliminary zoning;

ii) include the related areas and resources and permit such developments where consistent with objectives of the park; or,

iii) include the areas and resources and prohibit that they be developed.

In this latter case, the park plan will knowingly contain areas of future conflict. The team has drawn a battle line and arguments must be prepared to defend such a position. Is the effort worth the risk of losing the challenge?

The lands indicated on the PRELIMINARY ZONE MAP for education, interpretation, research and monitoring must provide the capacity to address the issues related to rural development. While most areas will have already been included by the previous steps, the focus of rural development warrants checking.

e) Include areas to provide space and the kinds of natural and cultural environs required for the educational and interpretative needs of rural peoples to help them understand their environment and the role of the national park. These areas should focus on relevant questions pertaining to drought, erosion, flood, desertification, deforestation, fire, and the benefits of conservation.

f) Include areas to provide for research and monitoring on the problems facing rural development. For example, water production and runoff, agricultural pests, volcanism, etc., are relevant problems for research and monitoring.

g) Include areas to provide for the particular needs of rural peoples for recreation in the natural or cultural setting. This pertains to the traditional activities and sites which rural peoples have long utilized, and the development of new areas to cater to their particular wishes.

Ninth, analyze the areas required for the administration of the park or which are to be utilized in ways inconsistent with park objectives. The PRELIMINARY ZONE MAP has located natural and cultural resources which are capable of meeting the objectives of the park. But this is still a potential park. Experience demonstrates that parks require managers, rangers, interpreters, maintenance and administrative personnel to work and live in the area and make it function.

a) Locate the PARK HEADQUARTERS. This will generally consist of the central offices, the maintenance shops, storage sheds, transport garages and central radio station. The homes of some employees can be appropriately located near to headquarters, but sufficiently apart to offer privacy. Both the headquarters and the employee housing area are located to offer efficient access to the park and regional transportation system, and yet to be apart from normal park visitation. Often, many personnel not related to protection responsibilities can most effectively be housed outside the park in nearby communities.

b) Locate SUB-HEADQUARTERS (if necessary). Some parks, because of their size or their topography, will function most efficiently with one or more sub-headquarters. Such centers are generally smaller than the headquarters, and administer a particular sector of the park.

c) Locate RANGER STATIONS. All around the periphery of the park and at strategic locations throughout the various zones. Ranger stations are required. Generally, one to several rangers reside on these sites according to the task to be accomplished. Figure V-4 illustrates the placement of park headquarters, sub-headquarters and ranger stations.

The details of protection, administration and maintenance are to be worked out in Step 7. It is sufficient at this time to designate a zone for the PARK HEADQUARTERS which has an appropriate location for access and privacy, and a reasonable amount of level terrain for construction of the necessary buildings. In the case of large parks of perhaps 300,000 ha or more, or where topography separates the conservation area into two or more physiographical units, a zone for the SUB-HEADQUARTERS should be suggested.

It is difficult to anticipate the requirements for RANGER STATIONS at this stage of the planning process. However, many sites and situations requiring protection will be obvious.

While the administrative activities are obviously central to the successful functioning of the park enterprise, the accompanying physical installations are nevertheless intrusions upon the natural and cultural landscape. They are a necessary evil. And, there are others.

d) Locate non-conforming uses of the area. At the onset of a park, it is common to find uses, activities and physical installations which cannot be removed. For reasons of tradition, rural employment, social stability or economic commitments, these will generally be farms, mines, telecommunications towers, power line sub-stations, docks or wharfs or irrigation water sources, some of which must be allowed to remain. Ideally, it may be possible to phase their withdrawal from the park over a period of years.

e) Establish SPECIAL USE ZONES for both the administrative and the inconsistent uses. Such zones are to be recognized as being altered from their natural form, yet they are to be considered as normal parts of the management plan. To be ignored or simply "hidden" would be to disclaim responsibility and jurisdiction over them and the conflicts they raise with park objectives. They would become potential spots of cancer within the park.

The SPECIAL USE ZONES consist of small areas which include the necessary land to provide visual cover and dampen noise pollution. Where chemical pollution is present in air, water and soil, the zone must be sufficiently large to buffer the negative influences. Transport routes to such zones are particularly important since they provide for the marketing of products and services, the maintenance and servicing of installations, and the movement of employees. Where such uses must remain for some period, care must be taken that the transport routes are adequately buffered by zoning.

The administrative areas will probably remain on the same location for 50 or more years. While some inconsistent uses will remain for decades, others will be phased out quickly. The zoning in and around these areas must reflect both the short and long-term view (when the inconsistent uses will be removed).

Looking at the PRELIMINARY ZONE MAP, the SPECIAL USE ZONES are now added to locate both the administrative and inconsistent use areas.

Tenth, analyze the areas required for the reclamation of lands. On the removal of settlements, agricultural, lumbering, mining or other uses from the park, it will be necessary to promote the return of native vegetation and fauna. In the foreseeable future these areas will be passing through stages of plant succession, and the remains of construction and exotic plants and animals will be evident. These areas cannot be considered as "natural", and the types of treatment necessary to reclaim them (burning and burying of wastes, cutting out of exotic plants, removal of exotic animals, silviculture and native species, etc.), are not typical of management in other zones.

NATURAL RECOVERY ZONES are designated to denote areas being reclaimed by natural or man-assisted means. They do not pretend to be "natural" but they will eventually become assimilated into the landscape and (to some extent) the ecosystem. They are basis parts of the park management plan and are to be placed on the ZONE MAP. In the future, these zones can be converted into one of the other zones for more permanent dedication to park objectives. Examples of natural recovery zones are shown in Figure V-5.

Eleventh, draft the ZONE SPECIFICATIONS. On an individual sheet of paper for each zone the following details are recorded:

a) Name of Zone

b) Definition

c) General Objective

d) Description

e) Specific Objectives

f) Norms for Management

The name of the zone refers to: scientific, primitive, extensive use, intensive use, cultural, special use and natural recovery zones. Suggested standard definitions and general objectives are suggested in Appendix V-C. The description of each zone is to consist of a brief statement about the characteristics of the resources and terrain, and any notations relative to adjacent zones.

The specific objectives are drawn from the general objectives and focus directly upon the purpose of the zone. Norms are then drafted which consist of short statements to guide and orient later management decisions on the development, use, administration and protection of the zone. See the example of zone specifications in Table V-4.

Twelfth, identify the DEVELOPMENT AREAS and draft the DEVELOPMENT AREA SPECIFICATIONS. Some types of activities will be dispersed and require only minimal installations. Other types are concentrated and require facilities and infrastructure.

a) Identify the areas where activities will be concentrated and installations required. With the PRELIMINARY ZONE MAP and ZONE SPECIFICATIONS in hand, the team should analyze the requirements of zonal objectives. To accomplish the objective, what is needed? An interpretative facility? And, what kind of infrastructure is necessary? Parking lot, electricity, sanitary facilities, water? Are overnight facilities required, or is the area to be day-use only?

b) Study the basic characteristics for each area. The team must visit each area and consider drainage, water supply, and soil properties with a view of construction and the resistance to compaction. Access is analyzed. And, the scenic values are checked. The question is to assess whether the proposed development area is conceptually capable of being an activity center of the zone.

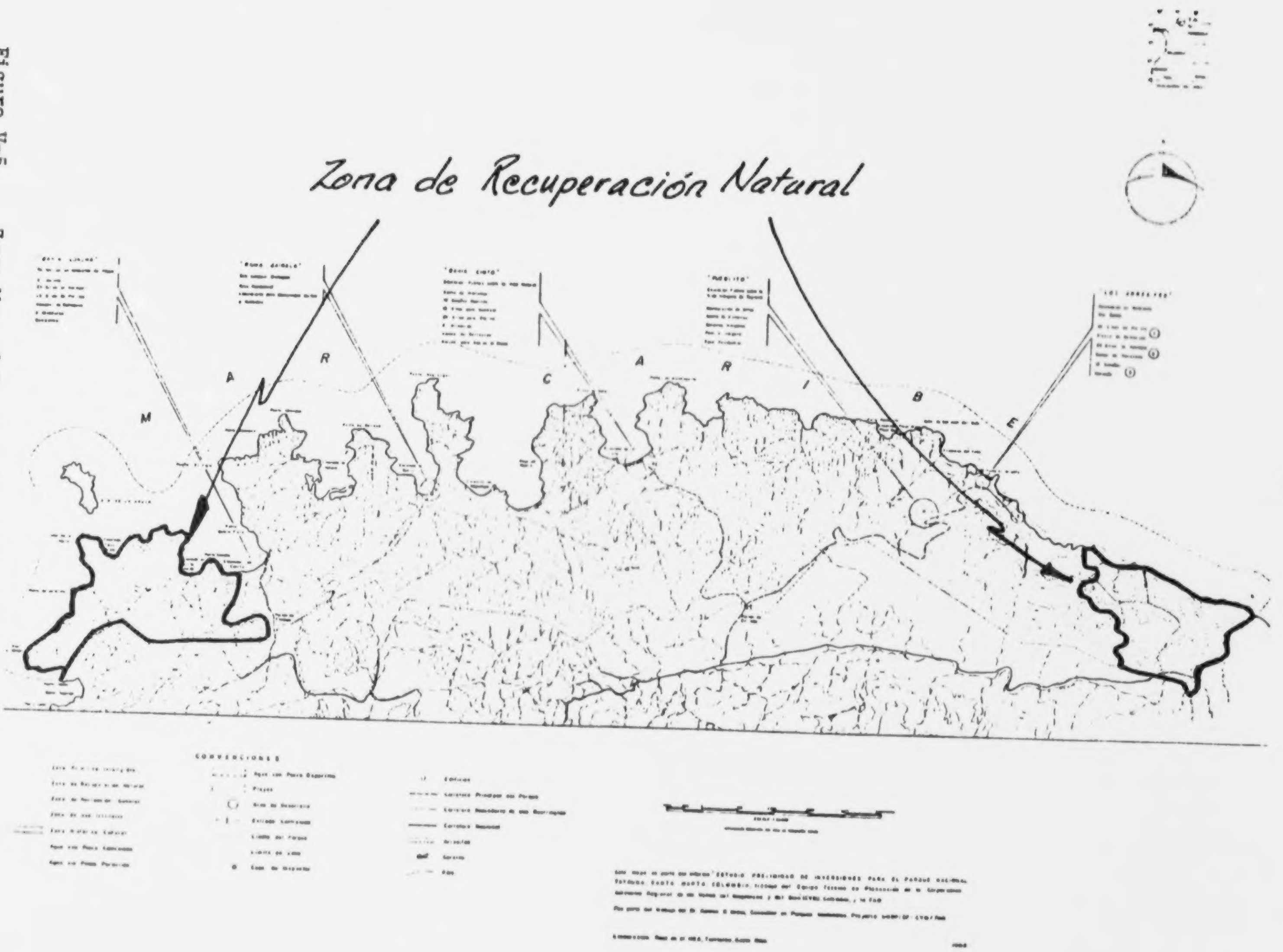


Figure V-5. Zone Map of Tayrona National Park, Colombia, showing the Natural Recovery Zones. (Source: Miller, 1968).

TABLE V-4

SPECIFICATIONS FOR ZONES

Example from Torres del Paine National Park, Chile

ZONIFICACION

Para lograr los objetivos de manejo establecidos, es necesario dividir al Parque en "zonas", de acuerdo con las características de sus recursos y al uso que se les debe dar. De este modo la presente zonificación comprende los aspectos de control y manejo del Parque y en ella se dictan normas para especificar los tipos de usos e instalaciones permitidas o necesarias dentro de cada zona.

Es útil destacar sin embargo, que aunque se zonifique, todo el Parque está dedicado a la conservación y protección de aquel ambiente que motivó su establecimiento. Las siguientes normas generales se aplican a todo el Parque:

- Eliminar especies de flora y fauna exóticas y evitar al máximo posible nuevas introducciones.
- Prohibir el uso o la presencia de animales domésticos salvo los necesarios para usos administrativos.
- Construir instalaciones conforme a normas de estilo arquitectónico y con materiales que estén en armonía con el paisaje.
- Prohibir el empleo y la instalación de propaganda comercial.
- Prohibir la posesión y el empleo de armas de fuego.
- Prohibir la corta y extracción de vegetación y la caza o colección de fauna y sus productos.

Para el Parque Nacional Torres del Paine se contemplan las siguientes zonas de manejo: Zona Primitiva, Zona de Uso Extensivo, Zona de Uso Intensivo, Zona de Recuperación y Zona de Servicios, o de Uso Especial.

Zona Primitiva

Definición: Esta zona consiste normalmente en áreas naturales que tienen escasa intervención humana. Puede contener ecosistemas únicos, especies de flora o fauna o fenómenos naturales de valor científico que son relativamente resistentes y que podrían tolerar un moderado uso público. Se excluyen de esta zona los caminos y el uso de vehículos motorizados.

El objetivo general de manejo es preservar el ambiente natural y al mismo tiempo facilitar la realización de estudios científicos, educación sobre el medio ambiente y recreación en forma primitiva.

Descripción: Esta zona ocupa la mayor parte de la superficie del Parque y consiste en el gran macizo del Paine con sus cerros, torres y ventisqueros. Abarca también los lagos alimentados por las aguas provenientes del macizo y las pampas abiertas que rodean a los cerros y lagos en los costados norte, este y sur. En estas áreas se encuentran los ejemplos menos intervenidos de la flora y fauna autóctona, el paisaje espectacular que caracteriza al Parque y un sector del hielo continental. La vegetación en las pampas y los faldeos ha sido alterada por pastoreo, incendios e introducción de especies vegetales exóticas. Alrededor de las edificaciones de las estancias y sus campamentos, se encuentran plantas introducidas que son susceptibles de eliminar. La zona alcanza hasta los límites del Parque salvo donde hay vías de tránsito o áreas recreativas en los márgenes oriental y sur. Al oeste la zona y el Parque limitan con el Parque Nacional Bernardo O'Higgins e incluye parte del hielo continental. La zona está planteada para dar contorno escénico silvestre a los núcleos y vías recreativas, turísticas y educacionales.

Objetivos Específicos:

- Restablecer poblaciones de fauna autóctona, especialmente de guanaco y ñandú en las pampas y cerca de los lagos, y la vegetación en los faldeos de los cerros y en las áreas altamente erosionadas.
- Procurar que especies como el guanaco y el ñandú puedan observarse desde los caminos y las áreas recreativas y educacionales.
- Facilitar el uso del área para las actividades de excursionismo y andinismo.
- Estudiar e investigar la sucesión vegetal y la riqueza genética para apoyar la propagación de la vegetación en áreas alteradas y asegurar la conservación adecuada de los vestigios vegetales y de los ecotonos.
- Estudiar e investigar los requerimientos de habitat de guanaco, ñandú y otras especies autóctonas y el ambiente del Parque para apoyar a la repoblación de la zona con estas especies.

Normas:

- Toda intervención en la fauna autóctona se hará de acuerdo al resultado de investigaciones específicas y conforme a los principios generales de manejo de la fauna silvestre.
- Se eliminará gradualmente el ganado doméstico y en lo posible, las especies vegetales exóticas.
- Se removerán todos los cercos interiores salvo los indispensables para fines administrativos.
- Se tratará de favorecer la recuperación vegetal por medios naturales con la eliminación del pastoreo y el control de los incendios. Donde la erosión ha alcanzado un grado mayor, se aplicarán obras de corrección, pero siempre con especies nativas y en formas que armonicen con el paisaje.
- Se construirán senderos para el excursionismo y el patrullaje, que causen el mínimo impacto en el medio ambiente.
- En los refugios rústicos se instalarán servicios sanitarios y de seguridad mínimos. Como excepción a las normas generalmente aplicadas a zonas primitivas, se instalarán campamentos techados rústicos, para uso de emergencia durante tormentas inesperadas.

Zona de Uso Extensivo

Definición: Esta zona consiste principalmente en áreas naturales, pero también se puede aceptar aquellas con algún grado de alteración humana. Tiene el paisaje general y muestras de los rasgos significativos del Parque. Sutopografía y recursos presentan una resistencia que permite desarrollos viales y actividades educativas y recreativas sin peligro de destrucción, dentro de un ambiente siempre dominado por la naturaleza. Está catalogada como sector de transición entre los sitios de más densa concentración de público y las zonas sin acceso de vehículos motorizados.

Los objetivos generales de manejo son mantener un ambiente natural minimizando el impacto humano sobre el recurso, pero al mismo tiempo facilitando el acceso y uso público del área, con fines de educación ambiental y recreación, sin grandes concentraciones de visitantes.

Source: Plan de Manejo. Parque Nacional Torres del Paine./Documento Técnico de Trabajo No. 19. Proyecto FAO/RLAT/TF-199. Corporación Nacional Forestal de Chile. Santiago, Chile. 1975 pp. 25-30.

TABLE V-4 Continued

Descripción: Esta zona incluye: las rutas de acceso y circulación alrededor del macizo del Paine, las áreas ribereñas y lacustres, de los lagos Sarmiento y Pehoé, y las estepas y algunos territorios faunísticos. Gran parte de esta zona limita con estancias vecinas.

Objetivos Específicos.

- Proveer oportunidades para que los visitantes en forma dispersa disfruten de la contemplación de la belleza escénica y de la fauna, sin grandes concentraciones de público.
- Procurar oportunidades para recreación extensiva en los diversos ambientes que contiene el Parque.
- Dar oportunidades para la educación pública acerca de las formaciones geomorfológicas del macizo del Paine, sobre los distintos ambientes ecológicos del Parque y en especial de la fauna silvestre.

Normas:

- Se permitirá un uso público general, no concentrado.
- Se permitirá caminos de baja velocidad, senderos, carteles de interpretación y señalización, mesas, bancos y otras instalaciones rústicas para actividades de camping y picnic.
- Se permitirá el uso de vehículos motorizados en los caminos indicados para ello.
- Se permitirá señalización compatible con los objetivos de esta zona.
- Los caminos se ubicarán y construirán en forma armónica con la topografía y el paisaje, minimizando los cortes y rellenos y con el mínimo ancho que permita el uso previsto.
- Las instalaciones y caminos se ubicarán de tal modo que sea mínima la alteración de la belleza escénica.
- En el lago Sarmiento se protejerá a lo menos una franja de terreno de 200 metros de ribera.
- En el lago Pehoé se permitirá el uso de embarcaciones menores sin motor.
- En esta zona se autorizará la instalación de posadas u hosterías para pernoctar, considerando las dificultades de transporte y de clima que existen en la región. Ellas estarán sujetas a normas arquitectónicas determinadas por el organismo encargado del manejo y control del Parque.
- Se permitirá la construcción de senderos de historia natural y de observación de la fauna en los cuales queda excluido el uso de vehículos.

Zona de Uso Intensivo

Definición: esta zona comprende áreas naturales o intervenidas. Tiene sitios de paisajes sobresalientes, recursos que se prestan para actividades recreativas relativamente intensas, y su topografía y suelo permite la construcción de caminos para tránsito de vehículos y las instalaciones de apoyo correspondientes. Aunque se trata de mantener un ambiente lo más natural posible, se acepta la presencia e influencia de concentraciones de visitantes, y las correspondientes instalaciones y servicios necesarios. Los objetivos generales de manejo son facilitar el desarrollo para la educación ambiental y la recreación intensiva, de manera tal que armonica con el ambiente y provoque el menor impacto posible sobre éste y la belleza escénica.

Descripción: Esta zona está ubicada en el sector sur del Parque, extendiéndose desde el lago Toro hasta el lago Grey como un corredor de ancho variable. Ella permite la creación de núcleos de desarrollo donde se podrán concentrar instalaciones como gasolineras, hosterías, refugios, áreas de camping y picnic, muelles y otros.

Objetivos específicos: están incluidos en los objetivos generales.

Normas: No se permitirán actividades (ni instalaciones que las faciliten) que estén en conflicto con los objetivos del Parque Nacional, tales como casinos, juegos mecánicos, deportes y juegos estructurados, etc.

- Las construcciones deberán someterse a las normas que se fijan especialmente en relación con la uniformidad de estilo y armonía paisajística.

Los objetivos generales del manejo son realizar las acciones necesarias para volver las áreas degradadas a su estado natural a fin de poder ser utilizadas en los objetivos del Parque.

Descripción: Las tres áreas comprendidas en esta zona son las del río Paine, la de Laguna Azul y Estancia Radic. Existen otros lugares que requieren de un proceso de recuperación, pero serán controlados evitando la continuación del factor degradante y sin efectuar mayores intervenciones. Se permitirá la ubicación de instalaciones administrativas.

Objetivos específicos:

- Eliminar el talajeo de ganado doméstico en los sectores Laguna Azul, río Paine o área degradada de Estancia Radic e iniciar la plantación de las especies vegetales autóctonas que existían originalmente, con el objeto de controlar la erosión.

Normas:

- Se permitirá la siembra o plantación de especies vegetales que originalmente existían en las áreas en recuperación.
- Se permitirá la reintroducción de especies de animales autóctonos que hayan sido eliminados en las áreas de recuperación.
- Se permitirán obras menores con el objeto de detener la degradación y ayudar a la recuperación del ambiente original. Estas obras deben tener el carácter de transitorias, mientras se establece un proceso de recuperación natural.

Zona de Uso Especial

Definición: Esta zona consiste en aquellas áreas, generalmente de una extensión reducida, que son esenciales para la administración u obras públicas y otras actividades que no concuerdan con los objetivos básicos del manejo de Parques Nacionales.

Los objetivos generales de manejo pretenden desarrollar las instalaciones necesarias, minimizando el impacto de éstas sobre el ambiente natural y el contorno visual y minimizar las distracciones al disfrute, movimiento y seguridad de los visitantes eliminando las actividades que no sean de beneficio público.

Descripción: Se consideran dos zonas de servicios, una ubicada en la costa del Lago Toro, que será la sede administrativa del Parque, y una subsede en la estancia Cerro Paine, que incluye un centro de investigación.

Objetivos específicos:

- Ubicar todas las instalaciones administrativas tales como vivienda, bodegas, garages, sistemas de eliminación de basuras, etc., en forma concentrada.

Normas:

- Con autorización previa se podrá mantener un número limitado de aves de corral u otros animales domesticos indispensables para la alimentación del personal administrativo y su familia. Estos animales deberán mantenerse encerrados.
- Para la eliminación de residuos, basuras y aguas servidas no podrá utilizarse botaderos abiertos o el vaciado en ríos o lagos.
- Las instalaciones que se realicen sobre los márgenes del lago Grey, deberán evitar la destrucción del bosque existente, salvo en el o los miradores que se instalen.
- Los caminos serán de la mejor calidad funcional y en pistas de una o doble vía, considerando, en el diseño de las primeras, su posible ampliación.
- Las instalaciones deberán ubicarse en áreas ya alteradas.
- Los sitios de camping y picnic, deberán situarse en áreas separadas pero podrán disponer de servicios básicos comunes.
- La eliminación de residuos, basuras y aguas servidas no permitirá botaderos abiertos o el vaciado en ríos o lagos.
- No se instalará dentro de esta zona, ni en ninguna otra, canchas de aterrizaje y sólo se autorizará la operación de helicópteros o hidroaviones en casos de emergencia calificados.

Zona de Recuperación

Definición: Esta zona está dedicada a asegurar la recuperación de áreas alteradas por efectos antropogenos, tales como cultivos, sobrepastoreo, incendios, contaminación, caza, etc. En estas zonas se permiten acciones de modificación del ambiente, que tengan por objeto detener la destrucción y asegurar el proceso de recuperación. En general, estas áreas no serán utilizadas por el publico hasta haber cumplido con este objetivo primario.

c) Prepare the SPECIFICATIONS for each DEVELOPMENT AREA. A separate sheet for each area is recommended with the following information:

a) Name of Development Area

b) Theme of the Area

c) Service to be Offered

d) Facilities Required

e) Infrastructure Required

The name should be derived from the locale. The theme is an expression of the purpose of the area and must reflect the objective of the zone in very specific terms. The list of services (camping, picnicking, research, administration, etc.), shows what shall be offered in the area and in what general amounts. The facilities (buildings, exhibits, structures, sanitary services, etc.), and infrastructure (parking, electricity, water, etc.), required to make the services available are listed by type and quantity. An example of development area specifications is shown in Table V-5.

d) Locate the DEVELOPMENT AREAS on the PRELIMINARY ZONE MAP as conceptual circles, as illustrated in Figure V-6.

Thirteenth, identify the SITES where specific activities and developments are to take place. The team now must examine each development area in greater detail.

a) Analyze the specific locations and settings for the activities, facilities and infrastructure as outlined in the development area specifications. The team will study the terrain as they discuss the characteristics of each development area. With hand level, compass and other simple field instruments, the aspects of drainage, water supply, access and sewage can be examined to at least insure that each development area contains the characteristics necessary to site each activity, facility and infrastructure as called for in the specifications.

b) Prepare DEVELOPMENT AREA MAPS showing SITES and general layout of developments. From the BASE MAP and aerial photographs a map of each development area is to be sketched. Within it the various SITES for facilities and infrastructure are sketched and labeled to give a conceptual perspective of how the development area will function. Figure V-7 illustrates a development area map where sites for individual activities are located.

Fourteenth, cross-check the zoning proposal to insure adequate consistency. The team has now prepared the elements of the zoning for the park. The PRELIMINARY ZONE MAP, ZONE SPECIFICATIONS, DEVELOPMENT AREA SPECIFICATIONS and the DEVELOPMENT AREA MAPS, contains the important information. All objectives should have been addressed. The

TABLE V-5

SPECIFICATIONS FOR DEVELOPMENT AREAS IN TAYRONA NATIONAL PARK, COLOMBIA

20 **Area Bahía Cinto**

1 **Tema:** Educación pública sobre vida natural por medio de programas de interpretación y de actividades de recreación enfocados principalmente sobre la vida marina.

2 **Actividades:** Observar exhibiciones preparadas de flora y fauna y su ecología; conseguir información sobre la naturaleza, el parque u otros parques de Colombia y el programa de la CVM; observar la vida marina por medio de buceo o a través de otras facilidades proporcionadas; acampar, alquilar cabañas rústicas, hacer caminatas hasta miradores, hacer pic-nic, comprar refrescos y meriendas y aprovechar los servicios básicos.

3 **Facilidades:**

a- Centro de Visitantes, edificio de museo com sala de exhibición, oficina, pequeña biblioteca, sala de conferencia y proyecciones. laboratorio para preparar exhibiciones, sanitarios, sala de recepción, bodega y almacén de ventas al público. Sería aconsejable en el futuro agregar un acuario pequeño para mostrar las especies de animales marinos predominantes en el Área.

b- Casa de Biólogo como la de Gayraca.

c- Casa de Inspectores para un guarda y su familia, más un guarda permanente soltero, y dos guardas adicionales durante patrullajes.

d- Casa Jefe Proyecto,ya existe pero requiere modificaciones.

e- Casa de Huéspedes con tres dormitorios, estar comedor, cocina, bodega, sanitarios, ducha y lavamanos.

f- Diez cabañas estilo rústico, fáciles de mantener, con sanitario, ducha, lavamanos, dos dormitorios y barbacoa afuera para cocinar.

g- Sitio con 25 unidades completas para hacer pic-nic con mesa, barbacoa, basurero, debe además contar con batería de sanitarios, duchas, lavamanos y llave de agua para cada 5 unidades.

h- Sitio con 15 unidades completas para acampar con puesto preparado para la carpa, mesa, barbacoa, basurero y una batería de sanitarios, lavamanos, ducha y llave de agua para cada cinco unidades.

i- Kiosco para alquilar equipo de buceo y contratar un guía.

j- Kiosco de refrescos con venta de elementos comestibles y carbón.

k- Dos miradores ubicados encima de los cerros altos al este y oeste de la bahía.

l- Entradas, salidas parqueos, senderos y señales como sean necesarios. También será necesario manipular la vegetación para esconder las instalaciones, separar sitios y dar sombra (todo con especies de la localidad).

4 **Servicios Básicos:** Se necesita corriente eléctrica de 110 voltios permanente para luz y aparatos sencillos, para las bombas de aire y agua de los acuarios, agua dulce para los servicios arriba citados; agua salada para los acuarios y radio en centro de visitantes y la oficina del encargado.

Source: Miller, K. R. 1968. El programa de manejo y desarrollo de los parques nacionales de la CVM, Colombia. Estudio de pre-inversion para el desarrollo forestal en los valles del Magdalena y del Sinú. Informe del proyecto FAO/PNUD/IICA, Turrialba, Costa Rica. Apendice 2, pp. 11-12.

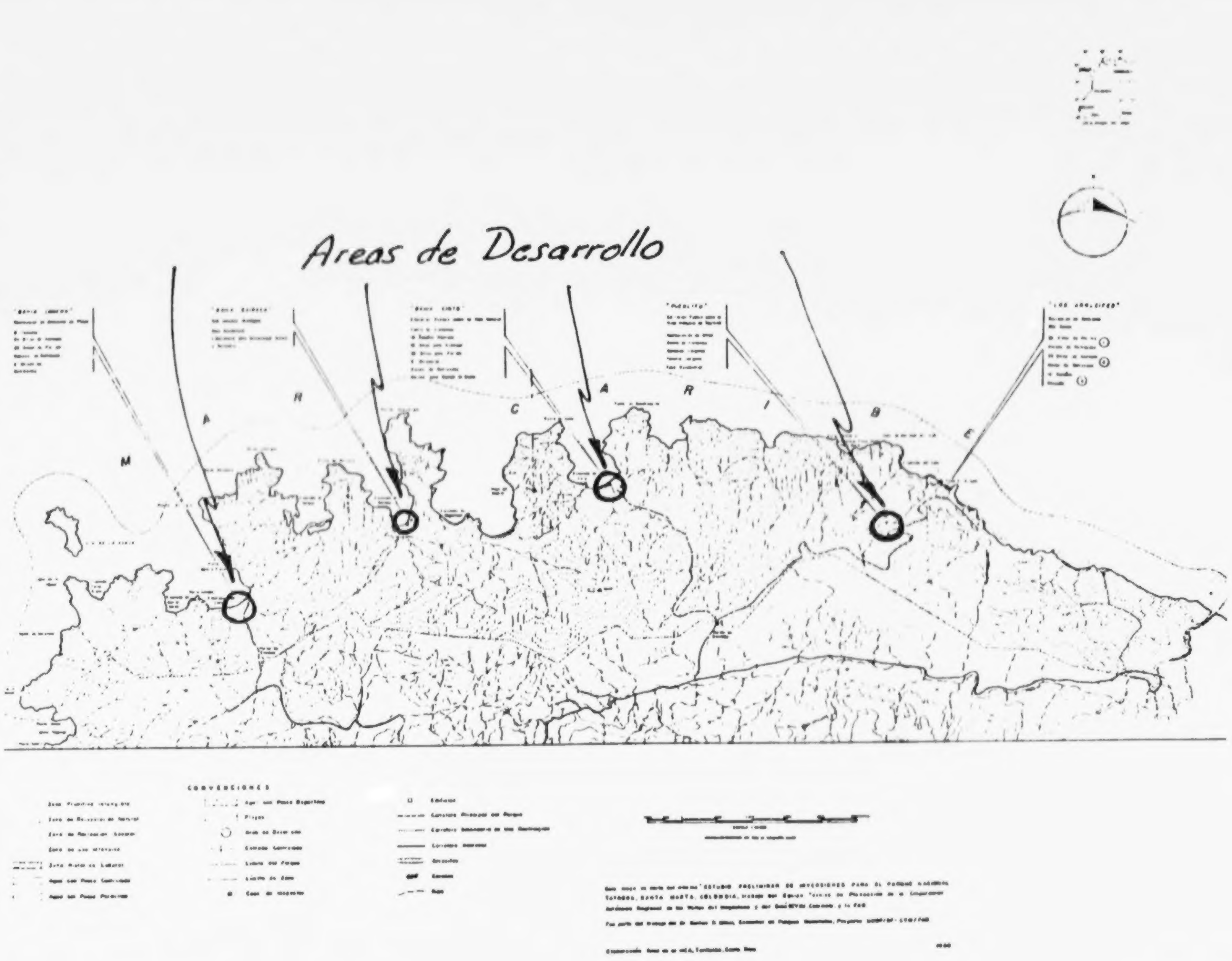
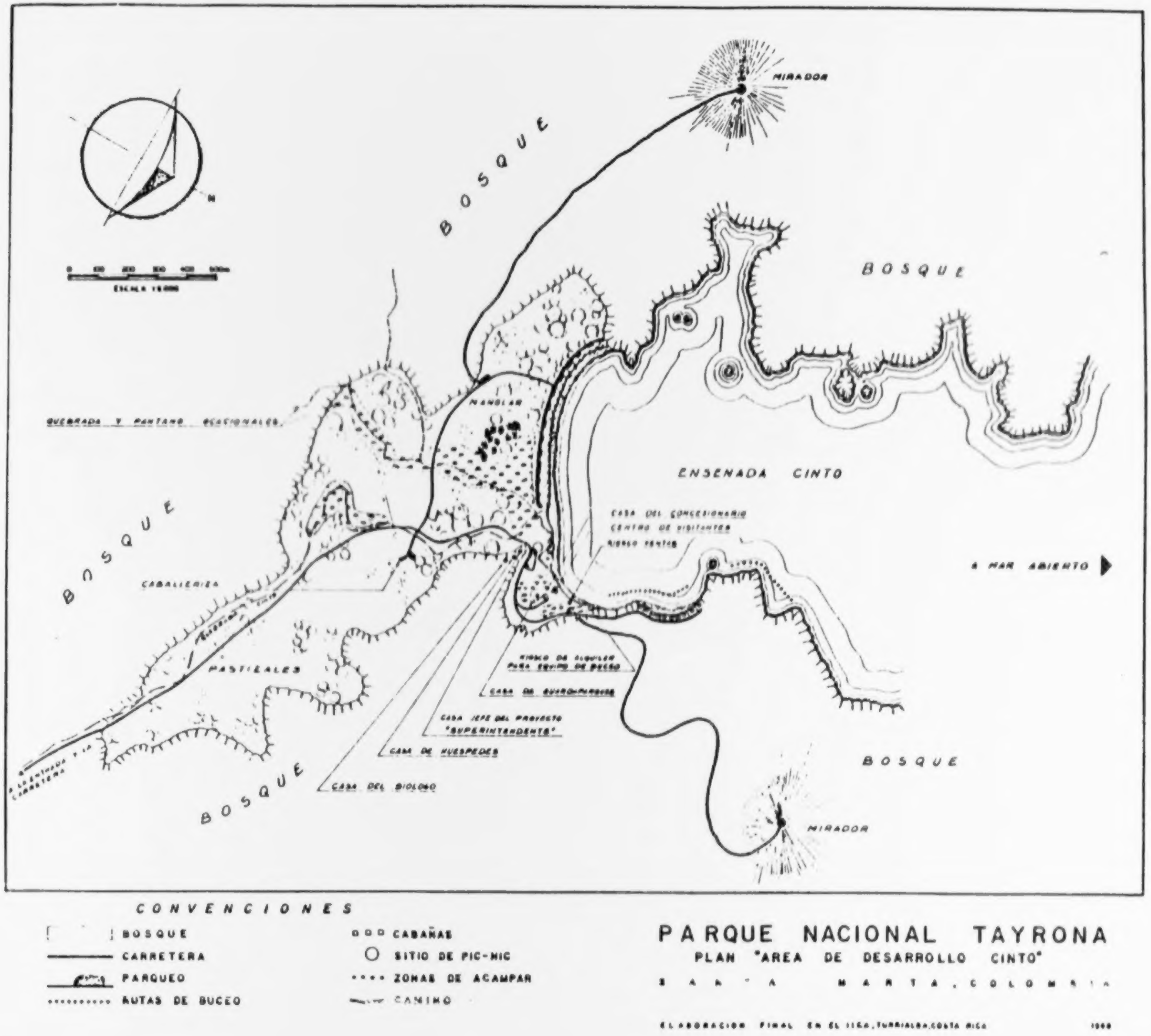


Figure V-6. Zone map of Tayrona National Park, Colombia, showing Development Areas.

Figure V-7. Map of Cinto Bay Development Area, Tayrona National Park, Colombia.



capacity to meet each should be clear. The next step is for the team to run five separate tests to insure that the zoning proposal is consistent. The five tools were explained in detail in Chapter III:

Functional gradients

Buffering

Vertical integration

Horizontal integration

Regional integration

a) Examine the various functional gradients. Discuss the movement of human visitors to and throughout the park. Trace them on the PRELIMINARY ZONE MAP as they travel from place to place through the DEVELOPMENT AREAS. Members of the team should describe scenarios of researchers, recreationists, groups seeking educational experiences and training. The relationships and impacts of these movements upon areas of interest to science are analyzed. For example, the team may discover that their proposal will have hundreds of people pursuing recreation activities within 500 m of the research station. Is that acceptable? Another case might involve the need for a road which will require a bridge over the river from which municipal water is taken downstream. Can the bridge be built and maintained without provoking sediment?

Similarly, the team should trace through wild animal migrations, research, sewage, transportation streamflow, inconsistent uses, etc. Debate and inquiry are the key tools in this step.

b) Examine the buffering between zones and between the zones and the exterior non-park lands. The team then discusses the transition areas along the boundaries between zones. Most critical is to search for drastic shifts from intensive activities to areas of scientific importance. As explained in Chapter III, the ideal transition is gradual, almost imperceptable, without fences or steps. The noise of the recreation activities should be absorbed by the forest before leaving the extensive use zone. The inconsistent use should not be seen or heard by park visitors.

The transition from the park to the exterior non-park lands should also be gradual. Naturally, this is more difficult since the adjacent lands may quickly be developed for agriculture or other contrasting use. As discussed in Chapter III, it is critical to try to surround parks with other wildland categories. But, when impossible, the buffering for the park must be accomplished inside the park's external boundary. The exterior kilometer or so of the park's territory will need to absorb fire, poachers, squatters, noise, chemicals and domestic plants and animals. It is important to check that the exterral strip does not carry any unique or valuable role in terms of nature conservation, research or monitoring.

c) Examine the proposal for consistent vertical integration. The PRELIMINARY ZONE MAP provides the basis for checking that the vertical elements are consistent. The park is comprised of zones which are sub-divided into development areas and sites. The objectives of the park are likewise sub-divided and specified. Does each element fit into the higher layer (see Figure III-16); can each layer hold the smaller elements? It should be possible for any team member to follow the threads of the park objectives down to the site-level and back up again.

d) Examine the proposal for consistent horizontal integration. Again, referring to the PRELIMINARY ZONE MAP, the analysis runs across the park rather than down into it. The zones together must possess all of the capacity needed to meet the park objectives. Are all of the parts there? Then, the development areas taken together must provide all the necessary action centers for meeting park objectives. Are all the activities implied by the objectives being provided in the development areas? The sites are the final level of refinement. Is there a site for all key developments being considered?

e) Examine the proposal for consistent integration with the surrounding region. The final cross-check is to place the park into the context of the region. The transition of the park with its neighboring land uses was examined for buffering external influences upon the park. Now the orientation shifts to check the role of the park upon the region. Each critical factor should be traced: rivers, water production, erosion and sediment, transportation system, employment, wild plant and animal pests, etc.

Fifteenth, correct all inconsistencies in the zoning proposal. Before continuing on in the planning procedure, it is necessary to make all necessary adjustments in the decisions previously made. The corrections may require returning all the way back to earlier steps in the procedure. For example, after the zoning analysis, it may be found that the area simply does not have the capacity to meet all of the objectives. That may require a chance in objectives, or it may require enlarging the park to obtain access of additional wildlands. Naturally, each change sets up a chain reaction along many other decisions. Again, dialogue among team members is the most useful mechanism to search for consistency.

In the likely even that the PRELIMINARY ZONE MAP has now become messed up by constant erasing and redrawing, it may be useful to draft a clear version upon one of the blank copies of the BASE MAP being carried by the team. This clean version will become the basis for the INTEGRATED DEVELOPMENT MAP in Step 8.

Step 6 -- Draft the Boundaries for the Park

The PRELIMINARY ZONE MAP contains a cluster of zones which possesses the physical capacity to meet the objectives of the park.

a) Extend the line around the exterior of the cluster of zones. As explained in Chapter III, the boundaries of the park may be stipulated in the law which creates the park. Alternatively, the plan may be prepared prior to the law. In either case, the boundaries should be cross-checked and proposed for revision in accordance with the results of the zoning step. It must be the physical and legal edge of a total unit to be meaningful. The logic in the boundary decision runs like this:

i) The basic unit of land to initiate the park is a sample of one of the nation's major ecological provinces.

ii) The transition areas or ecotones among the ecological provinces, biomes, habitats or life zones, are added to the basic unit in order to combine the greatest possible diversity of plant and animal species and habitat complexity. And, to the unit is added that area necessary to cover the hydrological system. The unit should be as self-regulatory as possible from within itself (an ecosystem) and should provide a regulatory function for surrounding lands.

iii) Unique, rare or representative plant and animal species of special value as genetic resources are included in the unit and the areas critical to their survival have been carefully noted.

iv) The natural resources and landforms necessary for the provision of educational, interpretative, research and monitoring functions have been included in the unit.

v) Sites suitable for recreation (facilities, access and activities) have been added in a manner that at the same time the unit can provide for ecosystem conservation, the various scientific functions and also provide visitors with the opportunity to enjoy and learn about the natural resources.

vi) As possible, historic or archaeological sites are included in the unit, and linked functionally with education, interpretation, research and monitoring; sufficiently protected lands surround the cultural sites to insure them a consistent setting.

vii) The areas of spectacular, inspiring scenic beauty have been included and are accessible to the recreational use of the park.

viii) All lands within the unit (i-vii) have the potential to be managed to protect water production and to minimize erosion and sediment.

ix) Finally, the relationship between the unit and the development and conservation of surrounding lands is clear. The unit has been harmonized (conflicts minimized) with transportation, communications, marketing, power and energy and employment considerations. And, the unit has the potential to offer opportunities to the rural peoples for education, interpretation, research and monitoring of relevance to their needs. Other considerations follow.

b) Check that the boundary circumscribes a relatively self-contained unit. The unit should contain a watershed or other physiographic feature the boundaries of which follow natural breaks in topography (for example, the ridges which divide watersheds). Where streams and coasts are to form boundaries, care is taken to insure that the ecotones are included within the park, i.e., that the boundary does not cut the transition zone along its greatest ecological diversity as exemplified in Figure V-8.

c) Check the boundary for its shape. The unit should be round in its general shape with a minimum of jagged edges around the periphery. Saw-toothed lobes soon become peninsulas of nature extending from the park out into adjacent land uses; these in turn are easily detached from the park to become small, biologically insignificant islands rapidly depleted of their species diversity. While the requirements of lands and access for recreation, scenic protection and cultural heritage preservation may lead to some odd shapes along the boundary, it must be recognized that such segments have little long-term value for nature conservation.

d) Check the boundary for the gradient from park to adjacent lands. Hopefully, the line does not form a wall of confrontation between wilderness and intensive human use of the land. In the ideal, the line runs through forest or water, with the exterior lands under another wildland management category. Unfortunate, but often necessary, is the case where the line must be marked by a fence. The buffering of adverse external effects is allowed for within the park boundary except where a surrounding wildland category can be guaranteed to fulfill the function.

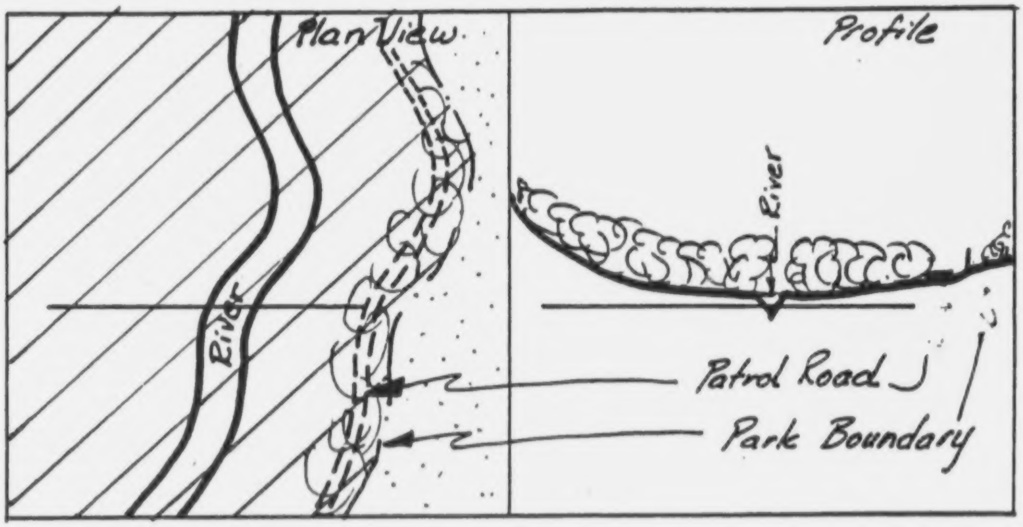
e) Check to note whether the boundary line is practical. Most boundary lines can be patrolled and inspected by rangers with relative ease. Some edges of the park will lie along ridges, across forests and out in the sea. While it is not necessary that the boundary areas be patrolled directly on all their margins, it is important that the location of the boundary itself discourage conflicts. Where problems are likely to occur it must be possible for action to be taken. Some combination of roads, trails, boat access, lookout points and perhaps the occasional use of aircraft will need to be contemplated to provide for the practical control of the perimeter.

f) Make the necessary changes in the boundary on the PRELIMINARY ZONE MAP. Taking into account the cross-checks of steps (b) - (e), it will normally be necessary to make corrections in the boundary extended around the cluster of zones in step (a).

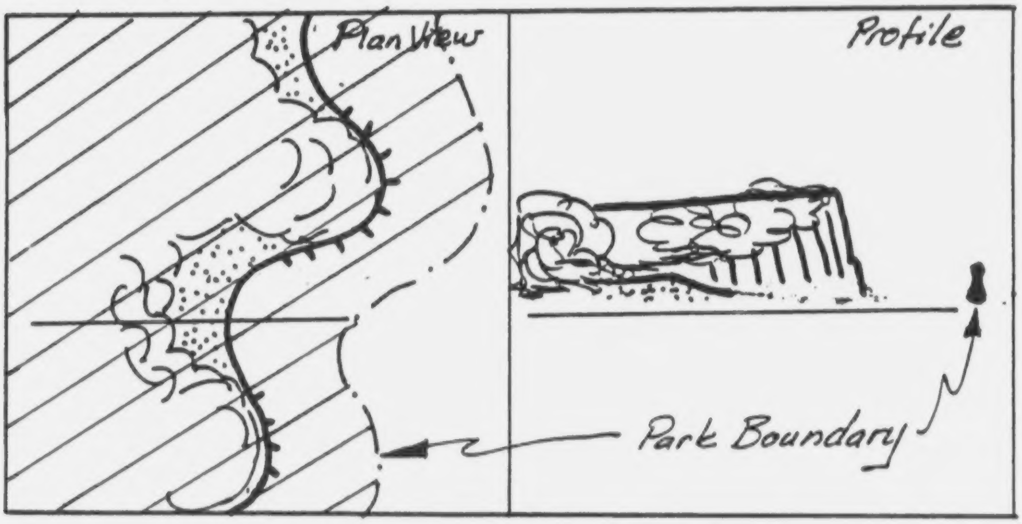
Step 7 -- Design the Management Programs

The preceding six steps have layed out a conservation unit which has the natural and cultural characteristics to do the job of a national

a) Boundary along stream.



b) Boundary along coast.



Transition area of greatest ecological diversity

Figure V-8. Boundaries must avoid cutting ecotones along their greatest ecological diversity.

park. Now the action elements of the plan must be designed to convert the potential park into an operating one.

The action elements of the plan are presented as MANAGEMENT PROGRAMS and SUB-PROGRAMS. While these programs are to be developed into greater detail in the forthcoming years, it is sufficient for the present level of planning to prepare a conceptual framework or MANAGEMENT CONCEPT which includes succinct statements of the objectives, activities, norms or guidelines, the required inputs and the timing and value or importance of the expected outputs.

The team is to work on all of the programs and sub-programs simultaneously. It is suggested that the team divide the responsibilities for each topic among its members. First, each program or sub-program can be prepared independently as a rough sketch based upon the information and maps available to all team members. Then, the individual members would relate to one another to coordinate their individual program sketches and eliminate contradictions, superimpositions and redundancies.

a) Design the ENVIRONMENTAL MANAGEMENT PROGRAM. Four specific sub-programs are suggested:

i) PROTECTION SUB-PROGRAM. What requires protection? How is the park to be protected from the visitors? The visitors from the park? The visitors from other visitors? And the park from the park? What are the threats facing the long-term stability of the natural and cultural resources of the park? What can be done about them? What action is required: ranger force, physical design to deter the problems, education of the park visitor?

Prepare a MANAGEMENT CONCEPT for the protection of the park and park visitors. Following the model of Table V-6 the objectives, activities, norms and guidelines, requirements, timing and expected benefits of protection are to be presented. This element has many linkages with other sub-programs, particularly recreation, resource management, interpretation, tourism and education. It will also relate to maintenance and administration presented below. The ranger may well be the agent to carry out the activities of several of these programs. (Note: The layout of the management concept, and especially the inputs and outputs should be kept as constant as possible throughout Step 7 since the subsequent steps will utilize this format and the information for analysis and evaluation.)

ii) RESOURCE MANAGEMENT SUB-PROGRAM. What needs to be done to the resources? Are there any endangered species which require special care or treatment? Do any habitats need manipulation, i.e., fire control or burning, exclusion fencing, exotic plant or animal removal, native plant or

TABLE V-6

SUGGESTED OUTLINE FOR PRESENTATION OF THE MANAGEMENT CONCEPT

1. Objectives:
   a)
   b)
   c)
   d)
   e)
   etc.

2. Activities:
   a)
   b)
   c)
   d)
   e)
   etc.

3. Norms and Guidelines:
   a)
   b)
   c)
   d)
   e)
   etc.

4. Requirements:

   a) Facilities (physical)
   b) Equipment
   c) Supplies (disposable)
   d) Manpower

5. Timing: (schedule of when activities are to be implemented, and when requirements are to be available)

6. Use/Value of the expected outputs: (benefits anticipated from research, protection, etc.)

animal re-introduction? Does a watershed require some special treatment? What about genetic materials? Are there plant or animal species with actual or potential direct value to man which warrant particular protection or treatment? Do historical or archaeological structures require restoration? This is done with constant reference to the PRELIMINARY ZONE MAP and reference to the development areas to keep potential conflicts in mind.

Prepare a management concept for resource management containing a statement of objectives for resource management, the kinds of resource management to be done, norms or guidelines for management activities, the requirements for the sub-program, and the timing and nature of the benefits to be expected from the sub-program.

iii) RECREATION SUB-PROGRAM. What needs to be done to facilitate the recreational use of the park? What activities are suggested? Where are they to take place? What kinds of problems are to be anticipated in terms of safety, sanitation and control? This analysis is done with the team examining the specifications and maps of the development areas, the PRELIMINARY ZONE MAP and the background information (from Step 1).

Prepare a management concept for the recreational use of the park. Following the outline of Table V-6, the concept will include objectives, a list of recreational activities, a set of guidelines for the management, a list of inputs required and a list of recreation services with their proposed timing and numbers.

iv) TOURISM SUB-PROGRAM. What needs to be done to facilitate the use of the park for tourism? What kind of tourism is desired? Who will the tourists be? How will the logistics operate: overnight in the park, outside the park, in a nearby town? Will there be concessions for the tourist services? Will they be based upon foreign participation, national capital, or will the entire operation be under the management of the national parks department? What kinds of problems can be expected from tourism (economic, cultural, social, political, etc.)?

Prepare a management concept for the touristic use of the park. This aspect must refer to national development policies regarding tourism. It analyzes the ways in which the park can support the realization of those development policies. Many of the conceptual elements will need to refer to regional policies in terms of the location of tourism facilities and employment. The presentation can follow the outlien of Table V-6.

b) Design the INTERPRETATION AND RESEARCH PROGRAM. Four sub-programs are suggested:

i) INTERPRETATION SUB-PROGRAM. What needs to be done to facilitate the understanding of natural and cultural heritage by park visitors? What resources are to be interpreted? How can they best be interpreted to the expected visitors? What means of communication can best be utilized to reach the diverse audience? What other institutions can collaborate in this effort?

Prepare a management concept for the interpretation of the park's resources. The outline in Table V-6 will serve for analysis. However, this is a specialized subject which requires the input of officers well-acquainted with the material. Again, at this stage of planning it is sufficient to present a conceptual framework for the interpretative program. The actual design of communications media, exhibits, themes, etc., will come later in another planning phase.

ii) EDUCATION SUB-PROGRAM. What needs to be done to integrate the park into the national educational effort? How can the park serve the schools and the universities? Can the park serve for graduate student research and thesis activities? Perhaps with the operation of a field laboratory, the park can serve to develop future national scientists. And, surely the park can offer special consideration to the educational and training needs of the local communities around the park: field trips, for local school children to outstanding sites within the park; training in wildlife management, wilderness survival, appreciation of nature, and comparative land use.

Prepare a management concept for the educational use of the park. This sub-program is one of the major outreach activities of the park and is capable of linking it to the entire citizenry of the nation regardless of socio-economic level or cultural background. The concept can follow the outline of Table V-6, and should benefit from the participation of scientists, educators, managers, local community representatives and students. The hours spent by team members with local people during the inventory stage will have special relevance here.

iii) RESEARCH SUB-PROGRAM. What needs to be studied to better know the area and to support management decisions and the interpretation of the park? What about studying the impact of visitors upon the park resources?

Prepare a management concept for research containing statements of objectives for research, the kinds of research to be done, the norms within which research should be conducted, the national institutions which should cooperate, the required inputs such as buildings, equipment, supplies and manpower, and the expected timing and use of the research results.

iv) COOPERATIVE SCIENTIFIC AND MONITORING ACTIVITIES SUB-PROGRAM. What needs to be watched? With whom, and for whom? What resources warrant monitoring? Perhaps the objectives of scientific institutions, both national and international, coincide with the interests and values of the park to: establish base-line study areas, to observe agricultural pests, to observe volcanism and measure seismic movements, hurricanes and pollution. Maybe a cooperative project with the Man and Biosphere (MAB) program or the Global Environmental Monitoring System (GEMS) of UNEP is warranted? (The MAB and GEMS programs will be discussed in greater depth in Chapter XI.)

Prepare a management concept for cooperative scientific and monitoring activities. The concept should follow Table V-6 with objectives, activities, norms, inputs and outputs. Particular attention should be given to monitoring and cooperative science as they relate to the key problems facing humans and the human habitat. Through working with local universities, research institutes, the national committees for the MAB program of Unesco, UNEP projects such as GEMS, and FAO and IUCN activities, the park can serve mankind yet remain wild.

c) Design the ADMINISTRATION AND MAINTENANCE PROGRAM. Three sub-programs are suggested:

i) ADMINISTRATION SUB-PROGRAM. What is required to support all of the above sub-programs? What kinds of numbers of personnel will be required to operate the above management programs? What types of training and career development will they require? How will the finance and accounting be treated? There will be a sizable need for purchasing and storage of supplies and equipment. Archives and a library will have to be established. Depending upon the policies being utilized by the park department there will be need for the administration of contracts and concessions (or inter-organizational agreements) and for safety and public health inspection and control. Provisions will have to be made to study land tenure and make acquisition of land as per the authorized boundary and management plan. The sub-program will administer activities related to law and policy and to control of physical development activities.

Prepare a management concept for the administration of the park. Some of the categories of administrative services enumerated above will require manpower, some require buildings, and most require that administrative procedures and systems be established. In many cases these will already have been developed and operated in other parks within the country and valuable experience can be gained by a review of past experience. In most cases, however, every new park warrants its own particular analysis to take into account its peculiar resources, location and situation. The format of Table V-6 will serve to guide the analysis, but it will be necessary to prepare extra tables for the individual categories of administrative services such as those illustrated in Tables V-8 and V-9 for personnel and organization. An additional analysis is often required for training and career development for park personnel (see details in Chapter VIII).

ii) MAINTENANCE SUB-PROGRAM. *What requires maintenance to keep all of the elements of the park in running order?* Both the natural and man-made capital will require upkeep in order to insure its smooth and efficient operation. Generally, the park will have transportation routes and vehicles, buildings, equipment and supplies. How are they to be maintained? Will the climate or peculiar conditions of the area affect the alternatives for maintenance? Would it be more efficient to have the maintenance done by non-park or non-ministry contracts? Are there possibly going to be some specialized types of maintenance (for example, salt-water aquarium, scientific laboratory and instruments, electronic equipment, large vehicles, electric generators, etc.)?

Prepare a management concept for the maintenance of the park. The outline in Table V-6 can be utilized. The analysis should concentrate upon the categories of installations and equipment to examine each for the general types of requirements. It is often useful to include the basic functions of maintenance as part of the work of the ranger force and a special maintenance crew. And, one or more sites for shops should be included in the complex of headquarters buildings.

iii) PUBLIC RELATIONS AND EXTENSION SUB-PROGRAM. *What needs to be done to share the values of the park with the local population, the nation and the world community?* Can films, literature or posters be placed in schools, airports, embassy cultural programs overseas? What about campaigns to bring children groups, boy scouts, worker syndicates, and government officials to the park for weekend pre-arranged tours? How can the park be sold to antogonistic groups with special interests which run counter to the park? How can additional funds be raised?

Prepare a management concept for the public relations and extension of the park. A recent effort to

TABLE V-8

SAMPLE JOB DESCRIPTION FOR THE POSITION OF "PARK DIRECTOR"

Nivel: Persona capacitada en el Manejo de Parques Nacionales

Funciones:

Aplicar las politicas de Parques Nacionales

Defender la imagen y el programa del Parque

Tratar con los directores de organismos y jefes autoridades locales

Representar oficialmente el Servicio Nacional de Parques Nacionales

Participar como integrante del equipo de planificación y manejo en el plan correspondiente a su Parque

Ejecutar el Plan de Manejo y Desarrollo del Parque:
- Confeccionar los programas y presupuestos anuales
- Coordinar el funcionamiento de los distintos servicios del Parque
- Fiscalizar en el terreno el cumplimiento de los programas

Velar por las condiciones del trabajo y bienestar de todo el personal

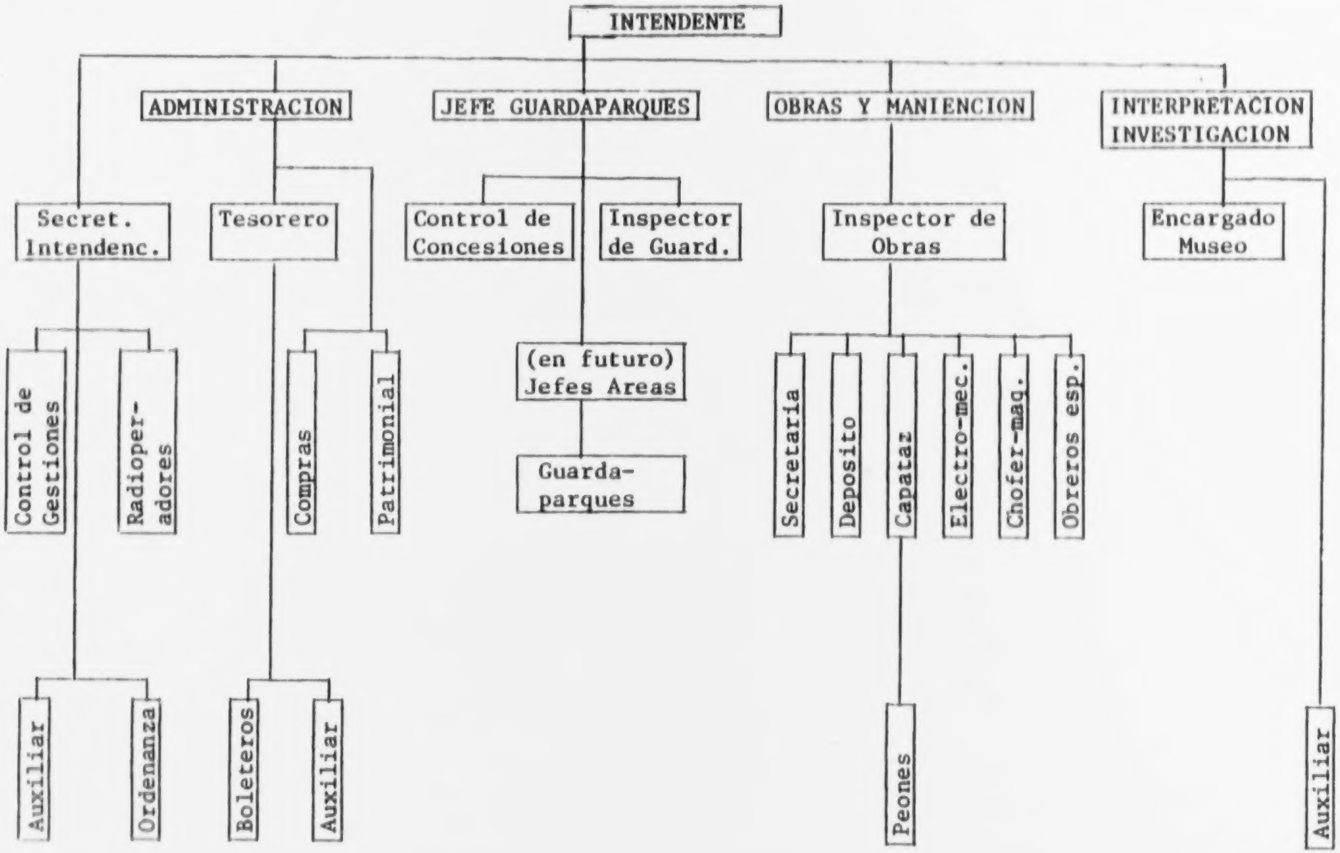
Fomentar y facilitar la capacitación progresiva del personal a su cargo

Calificar al personal a su cargo

Source: Proposición para el Manejo del Parque y de la Reserva Nacional Iguazú (Argentina). II Taller Internacional sobre Manejo de Areas Silvestres, FAO y el Gobierno de Argentina, Iguazú, 1973. p. 69.

TABLE V-9

SAMPLE ORGANIZATION DIAGRAM FOR AN INDIVIDUAL NATIONAL PARK



Source: Proposición para el Manejo del Parque y de la Reserva Nacional Iguazú (Argentina). II Taller Internacional sobre Manejo de Areas Silvestres, FAO y el Gobierno de Argentina, Iguazú, 1973. p. 68.

formalize the extension of park values to the public is the World Heritage Convention (to be elaborated in Chapter XI) by which areas of outstanding value to the world community are to be managed accordingly by the sovereign governments. These areas are to be shared globally through the presentation of educational and informational materials in several languages. At the national and local levels similar concepts apply. The outline in Table V-6 should be utilized.

Step 8 -- Prepare the Integrated Development Program

The management programs provide for an analysis of the activities necessary to achieve the objectives of the park. What else is required to convert the natural and cultural resources into action for conservation and development? Development is the adding of missing ingredients prescribed by management decisions. The INTEGRATED DEVELOPMENT PROGRAM is a synthetic process to (a) bring together the many factors analyzed in previous planning steps and (b) focus them upon particular places to accomplish specific things.

At this level of planning it is sufficient that a DEVELOPMENT CONCEPT be designed which can guide subsequent planning decisions. It should include a general list of what is to be built, what supplies, equipment and furnishings are required, and what infrastructure and utilities are required. It is suggested that the development concepts be focused by DEVELOPMENT AREAS. The theme already proposed for each area can be utilized to guide decisions on development. An outline for presenting the development concepts for development areas is shown in Table V-10.

a) Prepare the development concept for each DEVELOPMENT AREA. It is suggested that each development area (from Step 5) be analyzed one-by-one beginning with the most primitive and working towards the most intensively utilized.

First, what is to be built? Given the theme of the development area and the activities to be realized, the decisions focus upon adding the missing ingredients: a building, water source, picnic table, garbage pit, dock, interpretative exhibit, dormitory, administrative building, visitor reception facility, or parking lot.

Second, what supplies, equipment and furnishings are necessary? The management programs outline activities which will require furniture, vehicles, adding machines, camping equipment, horses and saddles, fire-fighting equipment, portable radios for rangers, outboard motors, and laboratory equipment. Suffice it to give a general description at this time upon which cost estimates can be calculated in Step 9. If any specialized supplies, furnishings and equipment are required, they would be carefully specified at this time.

TABLE V-10

SUGGESTED OUTLINE FOR PRESENTATION OF THE DEVELOPMENT CONCEPT FOR EACH DEVELOPMENT AREA

1. Name:

2. Objectives for Management of the Area:

   a)
   b)
   c)
   etc...

3. Architectural Theme:

4. Physical Structures and Facilities to be constructed:

5. Infrastructure and Special Basis Support Installations:

   a) Roads, parking areas, entrance ways, bridges
   b) Signs
   c) Trails
   d) Sewage
   e) Water (potable or non-potable)
   f) Electricity
   g) Gas, salt water or other special requirement

Third, what infrastructure and utilities are required? Each development area will require access by road, trail or water. Signs, fences, ramps, bridges and culverts will be needed. Some areas will require electricity, portable water, garbage disposal and even speciality items such as running salt water for interpretative exhibits on marine life. Telephone and ratio communications may be warranted. These concepts are added to the table being prepared for each development area.

Fourth, prepare a table for each development area in which the development concept is presented. It should include the name of the area, the objective and theme of the area, the developments which are required and the infrastructure necessary [and the expected outputs].

Fifth, integrate each development area. Before leaving each development to pass on to the next, it is necessary to examine each area to insure that the suggested developments are fully integrated into a consistent whole. Is there anything missing, redundant, overlapping? Taken together, do the developments yield a productive whole?

b) Prepare the development concept for STAFF DEVELOPMENT. Based upon the analysis of job description, organization and training requirements in the ADMINISTRATION SUB-PROGRAM, it is necessary to consider:

First, how will the employees for the park be obtained? Some individuals can be made available by transfer from existing national parks. Others will have to be recruited for new positions. The first task is to analyze the situation for obtaining employees for the park.

Second, how will the employees be trained for the tasks shown in the management programs? Both the employees obtained through transfer and recruitment will generally require some type of training. The task is then to determine the kinds of training needed to attain the managerial capacity called for in the management programs. Perhaps the park department has access to a national or international training school. Other alternatives include seminars, workshops, short courses and on-the-job training in a functioning park. The development concept for staff requirements must include a general plan for transfer and recruitment and for training in order to account for the associated costs in Step 9.

c) Prepare the development concept for INSTITUTIONAL FACTORS. The physical and human elements of the plan have now been considered. What remains is the context in which the resources and the staff must work. The institutional factors can obviously make or break the efficient operation of a national park.

First, are the laws and policies appropriate and sufficient for the new park? From Step 1, the laws and policies were analyzed. Now a park has practically been designed and it is appropriate to compare the existing laws and policies with the new proposal. If there are conflicts or uncovered areas, then the necessary corrective measures must be noted.

Second, are the general regulations applicable to the new park? The existing regulations may very well cover all existing parks, but the new park may be the exception. Perhaps the new park is the first marine park of the country. New regulations will most probably have to be developed.

Third, are the administrative procedures appropriate for the new park? Again, because the new park may be introducing new variables into the park system, it is quite possible that the existing administrative procedures will need to be somewhat modified to efficiently serve the park. A general concept on this problem will suffice.

Fourth, is there a need to develop new interdepartmental or international agreements (or to modify the old)? The activities called for in the management programs may require the cooperation of other government departments for research, construction, monitoring, tourism, or other. In some cases, such as those related to international environmental monitoring, the world heritage convention, or international research projects, it may be necessary to develop links through the national ministry of foreign relations with the secretariats of the related international treaties or conventions.

d) Prepare the GENERAL DEVELOPMENT MAP. On the clean copy of the PRELIMINARY ZONE MAP, the proposed physical developments are located along with symbols for the infrastructure and utilities. The individual items are to be placed with as much accuracy as possible to facilitate the conceptual examination of each installation.

Onto this MAP the important features from the inventory, such as topography, unique resources, critical habitats and inconsistent uses are transferred. The zones, development areas and sites are already noted. The developments are then placed into the development areas. Roads and trails are drawn to connect these areas and sites. The communications network is added, along with the major signs and the sites related to water, electricity, sewage, and the collection and disposal of garbage.

This MAP is the first full draft plan of what the park would look like were it to be managed and developed according to the decisions made from Steps 3 through 8. It is a conceptual model which can be examined and criticized without raising an axe or starting the motor of the bulldozer. It can be torn apart and rebuilt entirely in abstraction. An example of a General Development Map is shown in Figure V-9.

e) Cross-check the development concepts for inconsistencies. The team is in a position to examine the management and development concepts, the figures and tables on staff and institutional development,

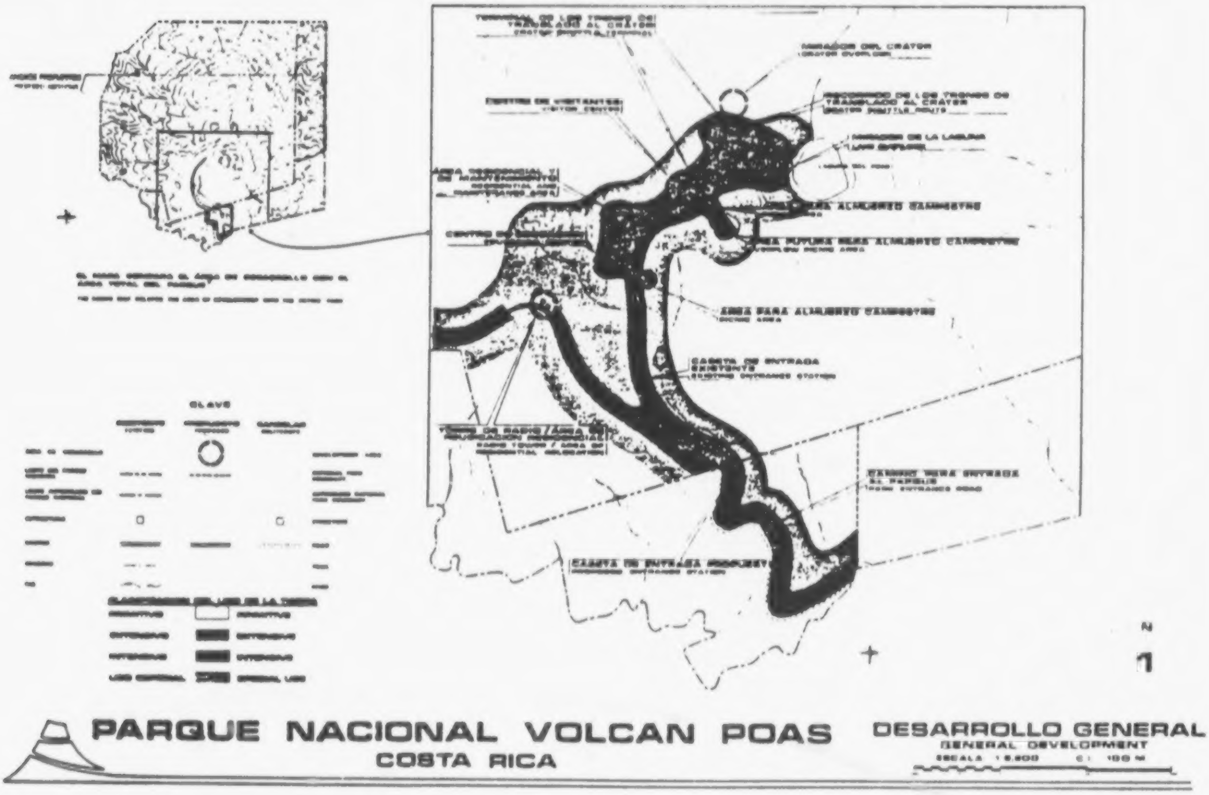


Figure V-9. General Development Map for Poas Volcano National Park, Costa Rica.

Source: FAO/Ministerio de Agricultura, Servicio de Parques Nacionales. Plan Maestro para la Proteccion u Uso del Pargue Nacional Volcan Poas. Documento Tecnico de Trabijo No. 10, Proyecto FAO-RLAT/TF-199. San Jose, Costa Rica, 1974. p. 44.

and the general development map. Together, the team members should systematically search for inconsistencies.

i) What will each physical development do for the achievement of the objectives? One-by-one, each development is scrutinized to insure its relevance and necessity. Each development must be defendable in terms of one or more objectives.

ii) Will each management sub-program be practical in light of the developments required? Each sub-program should be traced through, step-by-step, to insure that all the elements of a viable system are "present and accounted for." Most useful is to make a "dry run" or test run of each program. Create a scenario of the program in actual operation and have the members of the team work through the recreation system, the maintenance system, tourist system, environmental monitoring cooperative project with the United Nations, etc. Ask questions of the various systems: What happens if scientists and recreationists arrive the same day to a particular site? If the rains come early will the researchers be able to attend their experiments? If the maintenance machinery for roads were to fail for a week, will the park be operational, or will certain roads have to be closed?

iii) Identify missing links or superfluous developments and correct the development concepts and the general development plan map.

iv) Check the development plans with the overall integration of the zones, the park and the region, and make corrections. Make sure that the roads which link the zones together, and the park to the region outside the boundaries, have consistent characteristics. Again, look for the gradients across the boundaries onto adjacent land uses and examine the flow of park visitors to insure that there are as few abrupt transitions as possible. A key guideline is to insure that the developments have not converted the park into an island in terms of its role and function within the surrounding region.

v) Trace through the management and development concepts for personnel and staff development. Locate the personnel on the development plan map. If they were so located, could they do the job expected of them (as designed in the job descriptions)? Are there unprotected (overprotected) corners? Again, through group discussion, simulate situations by asking "What if...?" questions. Give special attention to the humanistic requirements and rights of the employees. How will they get their food? Schools for their children? Amenities for the families? What about advancement or higher responsibilities? What about the chain of command? Simulate a rescue operation, a fire, an avalanche or a flood, and analyze what would happen. Make the necessary corrections.

vi) Finally, trace through the various institutional factors which are suggested for development. Will they work? At what cost or with how much resistance? What kind of delays can be expected? The questions are relevant to the extent that perhaps some of the previous management and development proposals are dependent and contingent upon institutional improvements. If the institutional changes are considered to have low probability of success, then the corresponding developments may have to be reconsidered.

Step 9 -- Analyze and Evaluate the Proposal

The MANAGEMENT PROGRAMS (Step 7) gave conceptual basis for preparation of the INTEGRATED DEVELOPMENT PROGRAM (Step 8) made up of physical, personnel and institutional elements. The GENERAL DEVELOPMENT MAP represents the integrated statement of the entire proposal. However, at this point in the planning procedure, this statement remains an alternative. Is it the most appropriate one?

The team now turns to the quantification of inputs to estimate a budget for the proposal. Most relevant is to ask, if the proposal and the budget were to actually be implemented, would the objectives of the park be met?

The analysis and evaluation must be realized along the general lines commonly utilized by project evaluation procedures in the national planning office. While there is considerable variation among methods employed by the various countries, some general steps are common to all. With the help of the cost data in Step 1, some lined paper and pencils, and the experience of the team members, the following approach is simple and practical:

a) List and present the outputs and the inputs in terms relative to the national development plan, national development policies and the programs of the national park department. The layout for the presentation of outputs and inputs is presented in Tables V-11 and V-12. Where possible, the outputs and inputs are stated in both descriptive (qualitative) terms and also in financial (quantitative) terms. It is convenient to convert as many items as possible into monetary terms. However, where that is difficult, it is essential to state each item in descriptive terms which are meaningful to national development and conservation, and to the objectives of the park. The units of each may be quite different and therefore impossible to treat mathematically. But in the absence of common denominators to help add recreation plus education plus research, it is quite sufficient to analyze and evaluate the parts of the sum, rather than the sum of the parts.

b) Compare the outputs to the objectives. If the stated outputs were in fact to be made available, would the objectives be met? This

TABLE V-11

SAMPLE PRESENTATION OF THE OUTPUTS EXPECTED FROM MANAGING THE NATIONAL PARK

1. (number) ha. of the (name) biogeographical province, will be protected as a functional ecosystem in perpetuity. (Refer to the National Strategy for conservation to note how this output fits into overall plan.)

2. (number) ha. of transition areas between habitat (name) and habitat (name), will be protected, along with lakeshore lands, wetlands, riverine areas, etc.

3. Protection of genetic materials will include: (name of species) important to agriculture, medicine, forestry, fisheries and research on human physiology; (name of species) important to regulation of the environment, etc. Where known, state monetary values of particular species.

4. Maintenance of cultural values will include (name of structure), (name of sites), etc., which are of importance to national identity, to research on the past, past technologies, past land use, and for generating tourism. (Note foreign exchange potential or specific ares.)

5. Scenic beauty to be protected around (name) city, (name) highway, (name) cultural sites, (name) tourism and recreation areas. Outstanding physical resources of aesthetic importance to the nation will be protected (names). (Note any financial values, such as tourism, which relate to the scenery.

6a. Educational opportunities will be provided for (number) of students to visit natural and cultural areas each year; facilities will be available for (name) graduate students to work on advanced studies in the natural and cultural environment to prepare for future careers as national scientists; facilities will be available for (number) of teachers to be trained in environmental education and interpretation of natural and cultural heritage of the nation. And, the general public will be supplied with interpretative services, at a rate of approximately (number) per year.

TABLE V-11, Continued

6b. Research opportunities will be available for work on natural and cultural resources. Facilities will include a small research station with a laboratory (description), dormitory (number of beds) and (other). The area is particularly important for research (non-manipulative) on medicinal, agricultural, forestry, fishery, climate, hydrology, and other critical questions facing ecodevelopment. (Name examples of important research opportunities.)

6c. The area is particularly useful for monitoring weather, agricultural pests, plant succession, upstream relations to downstream fisheries, bird migrations, wild animal populations, and other natural resources of relevance to environmental management.

7. Recreation facilities (name types) will be available for (numbers) of visitors per year, serving (name) communities and cities. The monetary impact of recreation is expected to value $ per year. Tourism will also be promoted. Foreign exchange from non-national visitors can be expected to rise to $ per year. And, the tourism potential of the area reinforces national policies towards the development of open international relations.

8a. The rural community will benefit from (number) of new jobs in such particular lines of work as (name). In addition, new roads and communications will provide added benefits for the transport of agricultural commodities valued at $. A new clinic and school will be developed in the town of (name) to serve park staff and the local community. The expenditures derived from park activities and tourism are expected to total some $ per year, (x) percent of which will be spent within the local community itself. This conforms with policies for supporting the redistribution of wealth to the rural areas of the country.

8b. The added economic activity in the rural area and the relocation of individuals from lands to be included within the park, will reduce negative human impacts on fragile areas totaling (number) ha. Those individuals relocated will be provided with alternative opportunities in (describe).

9. The (names) watersheds will be included within the park thereby provided protection for the stable production of water. The total output on water is (number) liters/years, contributed to (name) city potable supplies, hydroelectric power totaling ________ kwh/year, navigation valued at (number) tons of cargo, fishery production valued at (number) tons (or $), etc. Potential values of the various rivers flowing from the park are estimated at ($) in terms of future uses.

TABLE V-11, Continued

10. Specific sites (names) will be reclaimed by natural means to prevent erosion and the actual (or potential) destruction of natural or cultural resources (names), and downstream developments, food sources, etc. Note details of downstream investments actually or potentially affected by erosion from the park area.

Total $ value/year of quantifiable services to the community to be expected from the park management: $______

Summary of services from park management not exchanged on the monetary markets currently: ______

TABLE 12

SAMPLE PRESENTATION OF THE INPUTS REQUIRED FOR MANAGING THE NATIONAL PARK

	Development Cost $	Estimated annual cost $
1. Physical inputs include:		
a. summary (list) of buildings showing sq. mts. of contribution, and total cost........	____	
b. summary of roads and trails, showing (kms) of construction, and total cost................	____	
c. summary (list) of other elements, such as, signs, landscaping, bridges, entrance ways, etc.....................	____	
d. construction and development of interpretative and educational exhibits...............	____	
e. communications (radio, telephone) internal and external to the park...................	____	
f. electricity, gas and other energy systems................	____	
g. sewage and waste systems......	____	
h. vehicles by (types) and (numbers), total cost.........	____	
i. equipment for the various activities of management summary (list)................	____	
j. supplies......................		____
k. maintenance on buildings, roads, equipment, and amortization.......................		____
2. The development of human capacity includes:		
a. (number) of personnel of (types) of categories, total cost of salaries and benefits.		____
b. Training courses for (numbers) in (types) of areas of work...		____
c. regular annual training courses for (number) of personnel in (types) of materials..........		____

TABLE 12, Continued

		Development Cost $	Estimated annual cost $
3.	The management of the park requires that (name) legal measures be taken, that the (name) policy be revised, and that several (name) cooperative agreements be prepared. Legal capacity exists in the department, and its cost to the park project for these services will total............................	____	
4.	Miscellaneous inputs: include special consultants, research activities, etc....................	____	____
	Total cost for managing the national park:		
	Development Cost............	$____	
	Estimated Annual Operating Costs.............		$____

question requires scrutiny from technical, ecological and political as well as economic orientation. Again, the team is to debate the question from these different points of view. At this point, the team will learn if their statements of objectives (Step 4) are sufficiently clear. It is when the meter stick is actually utilized to measure something with care that its quality is finally judged.

c) Compare the inputs to the constraints. From Step 2, a series of constraints upon the park were stated. Are the required inputs reasonable in view of these constraints? The information from Step 1 also provides guidelines for judging the reality of the inputs. Can such a budget be found? Can the personnel needs be met? Are the facts and assumptions clearly reflected in the inputs?

d) Compare the outputs and the inputs. Now comes the central question. The OBJECTIVES provide the target. The CONSTRAINTS establish the scale of effort possible to hit the target. And the MANAGEMENT PROGRAMS and the GENERAL DEVELOPMENT MAP provide a statement on how to hit the target. So, will the inputs produce the outputs? If the money, equipment, supplies, staff, laws, policies, and all other tasks are in fact mobilized and installed as suggested by the proposal, will all those recreation, scientific, touristic, educational, conservation and other services be provided? Are there sufficient inputs? Too few? Are the outputs exaggerated, or too modest? Again, the team reviews the information from the technical, economic, ecological and political points of view.

e) Accept or reject the alternative proposal. The evaluation culminates with a judgment: the team either accepts the proposal, or it decides to rebuild it. From a technical standpoint they must ask: Will the proposal as presented yield the stated objectives if the management and development concepts are faithfully executed? There have been many estimations and guesses made during the planning procedure, and some errors of prediction can be expected. The proposal is considered to be technically feasible when it appears sufficiently probable that the proposal will work in spite of some small errors arising from the lack of information, experience and quantification.

Economic feasibility centers around the judgment that the expenditure made for the inputs is at least offset by the benefits to be gained from the outputs. If there were to be more than one proposal for the particular park then economic feasibility would also consider: Which proposal yields the most output per unit of input; or, which proposal requires the least input for unit of output? While seldom are several complete proposals made for the given park, it is absolutely relevant that underlying fundamentals of economic feasibility (albeit in this rather simplified form) be considered. Can more be gotten from the same expenditure? Can the costs be lowered for the same outputs? It is a search for efficiency in the use of scarce national budgets, manpower and wildland capital. The park plan, parallel with all other national development plan elements, must be lean and trim. Either the park planning team does the trimming, or someone less knowledgeable or sympathetic might yield the shears.

Step 10 -- Design the Development Schedule

In Steps 1 through 9, decisions have been made concerning what is to be done, where, how, why. The final question focuses upon when to carry out the particular management and development activities. It should be clear that most of the planning thus far has been conceptual and therefore the management and development activities still require considerable detail and analysis.

From the MANAGEMENT and DEVELOPMENT CONCEPTS, the GENERAL DEVELOPMENT MAP, the LIST OF OUTPUTS and the LIST OF INPUTS, it is possible to analyze (a) the appropriate order at which the activities are to be implemented, and (b) the appropriate timing of each.

a) Analyze the factors influencing the DEVELOPMENT SCHEDULE. Eight factors which were explained in detail in Chapter III, are among the most important in influencing the schedule:

i) Note the expectations for the demand of each output. What is required here is not an economic analysis of "demand", but rather, a review of the information gathered during the earlier planning steps and an assessment of the kinds and amounts of each output which are expected to be required in the future. It is extremely difficult to provide quantified analysis for many of the outputs which in themselves are not marketed and do not carry prices. But what is relevant is to establish the trends. For which outputs can the demands be expected to rise in the future? Which outputs will be declining because other organizations or areas will be taking over those activities? Perhaps some forms of recreation will be important at the beginning, but later will be provided by the municipal government. Perhaps the environmental monitoring sites need merely to be held at minimum cost for the next decade because there is not capability (or interest) to initiate the actual monitoring activities at the present time.

ii) Assess the supply of ecological information and guidelines. All of the proposals in the plan thus far presume that there are no conflicts with ecological knowledge. But, do the ecologists in fact have the data necessary to confirm the entire proposal as it now stands? Commonly, proposals are made presuming that research will be carried out to confirm or reject the ideas. Perhaps some roads must wait until animal migrations are studied; the interpretative exhibits and educational programs will have to wait until the field data are available to design the exhibits and educational materials; the bridges across the major river will have to wait until the construction site is checked for possible sediment into the downstream municipal water supply.

iii) Assess the urgency at which the various management and development activities should be implemented. For reasons of existing land uses (Step 1), physical constraints due to critical habitats, erosive zones, etc., some activities are clearly more urgent than others. Perhaps there is urgent need to fence a border to keep domestic cattle out of the park; to patrol a boundary where poachers are entering; resettle colonists who have settled upon a critical biological site. (These urgencies are within the sphere of technical consideration. Those related to socio-political considerations will be viewed in the eighth step below.)

iv) Analyze the constraints upon management and development due to engineering considerations. In what order must physical facilities be built? The foundation must be poured before the building can be constructed. Water must flow before it can be consumed in drinking fountains. Access must be available before building materials can be delivered to the construction site. The field museum must be constructed before the exhibits can be put in place.

v) What are the budgetary expectations? Step 1 provided the team with some anticipated guidelines about the budget which may become available for the new park. In Step 9, the costs for the park were estimated. One problem is to consider the total amount of money required against that which is available. Another problem is to match the rate at which the money becomes available to the rate by which it is to be spent. The cost of a very expensive park can be stretched over many years. Alternatively, when a park has highest priority, the entire cost may be covered in a few years. The team can set general guidelines as to the investment, operations, maintenance and amortization rates for this park, based upon experience with other parks, the particular proposals for this park, and the other programs being carried by the park department.

vi) How can the requirements for personnel be met? From the management and development concepts, the job descriptions, organization diagram and training table, the team can estimate the manner by which personnel may become available to the park. Some officers may be transferred to the new park from other areas. New recruits will need training which will require several months. Perhaps no interpreters are available in the country, and a scholarship will be required to send an officer abroad for post-graduate training; this will require a 1 - 2 year period (counting the time necessary to organize the program). These considerations have a very immediate bearing upon the schedule for development. Perhaps the interpretative scholarship should be implemented before the museum; the ranger training course before the road construction; etc.

vii) Assess the institutional constraints upon the schedule. Are there activities in the management and development programs of the park which could support urgent political objectives of the national development plan? Perhaps educational, water conservation, or recreational activities would greatly add to the kinds of welfare which the government is calling for. Perhaps an educational program for rural peoples will fit neatly into rural development programs. Maybe there are crisis considerations: flood, earthquake, volcanic eruption, drought, all could warrant response from the management and development schedule. It may be possible to respond to some of these influences. However, the park program is certainly not to become part of a political football game in which items on the list are kicked around to please one group or another. On the other hand, the park is an element of the nation and it uses the resources of its people for those people. The schedule cannot ignore reflecting the overriding influences of a socio-political nature.

b) Prepare the DEVELOPMENT SCHEDULE MAP. With the management and development concepts and the general development plan map in hand, a phased development map can be drawn from the park with the use of colored pencils. Each facility, structure, road, ranger cabin, radio, interpretative exhibit, employee house, etc., is drawn by periods as it is needed over the years. An example of such a map is shown in Appendix III-B.

c) Prepare the MANAGEMENT AND DEVELOPMENT SCHEDULE TABLE. From the schedule map, and referring to the details of the management and development concepts, a table is prepared showing the phased activity in greater detail. See the example in Appendix III-B.

d) Prepare a SCHEDULE NARRATIVE. The schedule can be most easily cross-checked by writing a narrative. In the process of describing what will be done in a particular order, the linkages become most obvious and transparent. Items will be jumped and duplicated. In spite of earlier analysis, there will be buildings without access roads, construction before ecological confirmation, employees without houses ready for their use, vehicles to repair before the maintenance facilities are installed, and the need for interpretative exhibits before the officer returns from his scholarship. This section should consist of short concise paragraphs such as those on Appendix III-B.

Step 11 -- Publish and Distribute the Management Plan

Steps 1 through 10 have guided the team members to formulate a plan for a national park. The decisions which have been made for the management of the area must be communicated to those who must implement or somehow act upon these decisions through a formal document -- the MANAGEMENT PLAN.

The readership of the management plan will include the park manager who has been a member of the planning team, has participated in making the management decisions, and subsequently, will be responsible for implementing the plan.

The park rangers, researchers, administrative staff and laborers are also participants in the planning process and will do most of the work of park management and development. The management plan must serve them as a guide and as a training tool.

The government officers of the legislature, national planning and finance will have been involved in the planning process and they must now instrument the park with legal support, construction permits and budget. These government officers will require a document which provides them with the information necessary to guide many related decisions in other socio-economic sectors. Their problem is to guarantee the harmony of the park with its surroundings and also that the park will yield the benefits to the nation as expected.

The general citizenry will also read the plan. Most importantly, people can use the plan to learn about the park and the perspectives for their use and enjoyment of it. They can discover the many benefits to be derived which would otherwise go unnoticed. Their weather and water are being researched. Their habitat is being studied by the nation's future leaders and scientists. Their own children will learn about their cultural and natural heritage. Their electric energy will be protected. Perhaps they will now understand why certain areas of the park will remain closed to public access; why a mineral or a timber resource will not be exploited in traditional fashion; or why the new highway must make what at first appeared to be an uneconomic detour around the park.

In this group of general citizenry, the foreign citizen is also to be included. Citizens from other countries also have an interest in the park because it may include natural or cultural sites or objects considered by many to form part of the world's heritage. Foreign citizens will wish to be informed how the sovereign nation is managing the resource and what opportunities there will be to visit the area.

Finally, the management plan serves to communicate with national, regional and international technical and financial institutions, such as the development banks, the United Nations agencies, the regional bodies such as OAS, the integration institutions, IICA, CATIE, etc., and non-governmental organizations such as IUCN, WWF, CLAPN and others. The plan will provide the basis for international coordination and integration. It may serve to attract financial support.

While this readership is diverse and should ideally receive several specialized planning documents, there is a scarcity of time and resources to prepare several editions. One basic type of management plan can be suggested. It is based upon an integration of the FAO

Regional Project's Planning Manual[7] and guidelines prepared by Wetterberg et al.[8]

a) Publish the MANAGEMENT PLAN

The management plan can be presented in three chapters: NATIONAL AND REGIONAL BACKGROUND, ANALYSIS OF THE CONSERVATION UNIT, and MANAGEMENT AND DEVELOPMENT. A suggested Table of Contents and a List of figures and tables for the management plan are presented in Tables V-1 and V-2, respectively. The information and experience which has been gathered during Steps 1 through 10 furnish all that is necessary to write the management plan.

It should be noted that the presentation of the actual planning document is different from the steps taken thus far in the planning process. The repetitive details of the decision-making process can now be presented in abbreviated form. The user of the planning document needs to know the plan being proposed. If further background information is required on how decisions were made, and details on the various alternatives considered are to be communicated, then a supplementary technical document may be prepared. A comparison between the steps of the planning process and the table of contents for the planning document is drawn in Table V-13.

In the INTRODUCTION to the management plan, the area to be studied is located in geographic terms. A short description of the are and a Location Map of the Park will relate the area to the national and regional context. A short statement would be made concerning the motivation for making the management plan and the institutions involved in the study.

The first Chapter -- NATIONAL AND REGIONAL BACKGROUND -- provides the reader with an appreciation of the national and regional context of the conservation unit. It also sets the stage for the analysis of the specific area, maintaining clear the relationship between the park and national and regional development plans and conservation issues. An outline for Chapter I is suggested as follows:

CHAPTER I

NATIONAL AND REGIONAL BACKGROUND

NATIONAL CONTEXT:

National Objectives for Conservation	The national objectives for conservation are listed and described. Particular reference is made to the national development plan or any regional plans which give mandates or directives concerning conservation activities and the particular conservation unit.
National Strategy and System for Conservation Unit	Where national strategies and systems plans have been prepared, reference is made to the ecodevelopment role of the conservation unit and the criteria for its management and development.
Biogeographic Regions and Provinces	The biogeographic regions and provinces of the nation are briefly described within which the conservation unit is located. The system proposed by Udvardy is useful for this purpose. A Biogeographical Map can be included upon which the unit is located.
National Transportation System	The major means of transportation for the nation are described in terms of the access to the conservation unit by sea, rail, river, roadway, air or other form.

REGIONAL CONTEXT:

Biophysical Features

a) Topography	The region is defined in terms of the most convenient geographic unit such as a river basin, mountain range, or political province. The topography and physiography of that region is described to provide a context for appreciation of the landforms and altitudinal variation in the park setting.
b) Watersheds and Drainage Patterns	Watersheds are major units for the context and work of conservation management. It is important to describe the hydrographic elements of the region as they relate to the park and its drainage patterns.

c) Water	The major elements of the water resources of the region are described, particularly in relation to lakes, rivers and ocean areas which serve for potable, industrial, urban, irrigation, recreation, touristic, power, navigation and other purposes. The role of the park in these purposes is clearly noted.
d) Climate and Weather	The major features of climate and weather within the region are described in terms to provide a general appreciation of the seasonal variation over long- and short-term periods.
e) Geology	The landforms of the region are described by major classes; the morphological and structural features of the region within which the park is located are given particular emphasis.
f) Soils	The soils of the region are related to give an overall impression of the quantity and quality of soils available for agriculture, livestock management, timber and other uses. The relationship of the conservation unit to the protection of agricultural soils is noted.
g) Vegetation	The vegetation is described based upon a useful method of vegetative typing and mapping, such as that of Holdridge. The conservation unit is located within the context of vegetation in the region. The current status and trends of forest clearing are noted as appropriate.
h) Fauna	The fauna of the region can be described based upon zoogeographic methods. Particular mention is made of disappearing species and particular animal-related problems in the region.
i) Role of Fire	In many regions, fire is a major element of ecological succession and land management. It may be natural or man-caused or both. Its presence and role are given explicit recognition. Major historic forest may be described and located as appropriate. Similarly, other natural factors may have major

	affect upon the region, including volcanic eruption, hurricanes, tidal waves, and earthquakes. These factors should be described in terms of their role in the region.
i) Critical Areas	Particular sites within the region are unique or of special importance because of the genetic materials they contain, their role as sources of water, their propensity to flood, avalanche or mass movement, because they offer habitat to migratory species, or fulfill other vital ecological roles. Wetlands, coastal areas and estuaries are particular examples of sites which can be noted as critical areas. The relationship of the park to such critical areas is clarified.
Cultural Features	
a) History	The human history of the region is summarized, with particular emphasis given to the role and use of natural resources. Important events are noted with reference to the sites where particular activities occurred. Such sites include battlefields, birthplaces of patriots, places where treaties or charters were negotiated or ratified, residences of famous musicians, writers or artists.
b) Archeology	Where human history dates back to ancient or pre-colombian times it is important to describe sites, structures or objects of interest for cultural heritage value. Such values will often include pyramids, forts, burial grounds, roadways and bridges, water systems, and mathematical or astronomical structures.

c) Anthropology	Human development and evolution within the region may be of importance to national history, pre-colombian geopolitics or colonization. Because of particular physical features of the region, human development and life-styles may be peculiar and significant.
d) Contemporary Culture	A brief summary is made of current human settlement in the region. While a more detailed analysis is made in subsequent sections on socio-economic features, it is important to note Amerindian groups which live within the region. Their life-styles and status are described.
e) Art, Literature and Music	In cases where the natural and cultural resources of the region have been significant to art, literature and music development within the region and nation, an appropriate description is presented.
Socio-Economic Features	
a) Regional Economy and Land Use	The present and projected land use of the region is described. Plans for future developments of roads, electrification, agrarian reform and colonization projects, industry and urbanization are analyzed. All projected relationships and conflicts related to land use are considered. The positive and negative effects of the park upon the rural economy are evaluated in terms of employment, new activities such as arts and crafts, land use, water conservation and primary production (through the withdrawal of lands from lumbering, grazing or cultivation). Explain the mechanisms for the participation of rural populations, local villagers and the general citizenry, in the management decisions and the benefits from the park.
b) Demographic Characteristics	The demography of the region is presented to characterize the settlement patterns and trends for the future. Also, demography is analyzed to project the numbers and kinds of users for the services to be provided

	by the park at the regional level. This information is presented to substantiate the pressures to be anticipated for park use and perhaps competition for land use.
c) Regional Transportation System	An analysis is made of the transport network of the region and its relationship to the park area to determine access for the various uses of the park. Projected roads, rail lines, airports or fluvial navigation are cited. An analysis is made of the alternative means by which park users will be able to reach the area, and the implications of planned transport developments upon access to the park.
d) Tourism, Recreation and Existing Infrastructure	Existing and project developments for tourism and recreation are analyzed to determine their influence upon the park. Following the presentation of the regional elements, a Regional Context Map is presented upon which important information from the biophysical, cultural and socio-economic analyses are placed. This map shows the location of the conservation unit in reference to these various features.

The information in the first chapter has provided a frame of reference for the analysis of the actual area of the national park to be planned. The factors and features which affect the park and the planning of its management and development will have been analyzed. There will be clear lines of reference between the national park and overall objectives and directives for ecodevelopment. The park plan is set within national and regional planning.

In Chapter II -- ANALYSIS OF THE CONSERVATION UNIT -- the characteristics of the area of the park are analyzed. The resources are described and analyzed at an intensity consistent with the decisions to be made for management development purposes. The descriptive and analytical information is written to support statements concerning the capacity of the resources to meet the various conservation objectives being addressed by the park.

This chapter conceivably could be written in the office following the inventory and field work of Step 3. However, the team is urged to write the chapter only after having completed Step 10, so that the resources are presented in terms of the decisions which had to be taken in the actual planning experience. In addition to the narrative, the chapter can be illustrated with maps, photographs and figures or tables as necessary to help the reader comprehend the resources.

The chapter should end with a clear concise statement which explains the SIGNIFICANCE of the resources: What is so special about the resources to warrant giving them particular attention as a national park? This establishes the basis for the justification of the management of the area as a national park.

CHAPTER II

ANALYSIS OF THE CONSERVATION UNIT

BIOPHYSICAL FEATURES:

Topography	The landforms and configuration of the area within the park is described. The level of detail will vary according to the kind of information required for planning decisions.
Watersheds and Drainage Patterns	The hydrography of the park area is examined and described in detail to clarify the limits of watershed units. The relationship of the waters flowing from the park to downstream activities and land uses is noted. Where waters flow into the park from outside of the area, an examination is made of the source and quality of those waters.
Water	The details of lakes, rivers, waterfalls, deltas, swamps and springs are described. Where appropriate, the chemical and physical properties of these waters may be described, to allow their comparison with other waters, and with the same sites at a future date. Particular attention is given to waters which exhibit danger for development and human use.
Climate and Weather	The information required for planning purposes will vary according to the particular situation. It is important to describe the levels and flucuations in temperature, precipitation, wind, and insulation, found in the park. Long- and short-term variations are often significant to planning. What is relevant is only that information which will affect planning decision on the management and development of the park. Other detail is superfluous.

Geology	Geological features, paleogeography, geomorphology and structure are described. Particular attention is given to active processes such as glaciation, volcanism and dune formation. Any effect of man's activities upon the geology or geologic processes are mentioned. An analysis of rocks and minerals may be relevant.
Soils	The soils of the park are described according to an accepted classification system. Of relevance is to note soils and sites which are erosion-, avalanche- or mass movement-prone.
Vegetation	A short description is presented of the ecological life zones of the park, with notes on the most representative species of each zone or association. Endemic, introduced and unique species are listed. Plant succession is analyzed to note ecotones or transition zones, and to locate sites with previous human activity. Special note is made of endangered species and the species which have recently become extinct.
Fauna	The major habitats within the park are described in terms of the particular species which they support. Seasonal variations such as migration, the laying of eggs and the bearing of off-spring are noted with reference to sites and species. Endemic, introduced and unique species are listed. And again, a special note is made of endangered species which have recently become extinct.
	It is important to note that modern work tends to integrate flora and fauna into ecological analysis by units such as habitats and ecosystems. Perhaps among the most important items to discuss in this section is the habitat requirements of important species, and the trends of particular populations. Emphasis is given to description and analysis of the representative ecosystem to be conserved, as well as ecotones, diversity and genetic resources.

Role of Fire

The role of fire in the ecosystems of the park are described with specific emphasis upon the need to plan for fire prevention, protection or fire management as a part of the park management programs. Other natural phenomena such as volcanism or shifting sands along coastlines may require that particular management or development activities be planned.

Critical Areas and Special

Following from the regional analysis individual areas may have been identified which are critical to downstream stability, rural development, animal migration or reproduction. The field work will have located sites which are dangerous to human use or which will effect the design and maintenance of roads, buildings, and other facilities. In addition, information should be given on sites of special significance for bench-marking and monitoring.

CULTURAL FEATURES:

History

All sites, structures and objects of historic importance are described and analyzed. A chronology of historic events is developed and the related sites, structures and objects are analyzed in terms of their stabilization, restoration and maintenance. The value of archeological and historical remains will depend largely upon the landscape setting in which the sites, structures or objects are found at present. To interpret these resources it is important that they have an appropriate natural and cultural setting. The visual and audio factors affecting this setting are described and analyzed in terms of site integrity.

Archeology

Archeological features are described and analyzed in terms of past cultures, the period, structures and land use. Of particular interest is to synthesize all research done on the archeology of the area in terms of what was found, where and whether there are areas of potential importance which have yet to be investigated. Graphic drawings, maps of the cultural history and diagrams of the original site are presented. Special emphasis is given to an analysis of existing structures and the treatment required for their stabilization, restoration and maintenance.

Anthropology

The relationship of the park area to human development is described. Whereas some parks have witnessed the evolution of humans in only superficial ways, others have been sites of major interaction between humans and the human habitat. Such features are described and analyzed, particularly as they relate to the interpretation of human culture for park visitors. Where Amerindian groups inhabit the park area, anthropological research may be advisable to guide management decisions in their regard. Alternatively, it may be suggested that anthropological inquiry may be untimely to the management situation, and should be left to the more distant future.

Contemporary Culture

Generally, a national park is designed to exclude human settlements. However, in some areas such as the tropical rain forest, it is virtually impossible to establish a park free from sparsely settled inhabitants. In such cases, the objectives of conservation can only be met by some form of combination with local inhabitants. Indigenous groups which continue to live in stable relationship with the ecosystem can perhaps remain in harmony with conservation objectives. In some special cases they may wish to participate in tourism or other park activities. Where human settlement exist within the park, it is advisable that an explicit policy be established on the relationship of these individuals and the management of the park. The facts and information necessary to propose and defend such policies are located in this section.

SOCIO-ECONOMIC USE OF THE LAND:

Present Land Use

A detailed presentation is made on past and present uses of the resources. This will include farming, cattle and other livestock husbandry, hunting and gathering, animal and fish utilization, and charcoal production. An analysis is made of the influences upon such local resident uses by the management of the area as a park, and vice-versa. Also to be considered are the numbers of habitants presently in the area, the type and extent of their activities, and the kind of legal or traditional rights of each. In addition to uses by the areas inhabitants, there are external uses such as downstream hydroelectric power generation, irrigation and other water uses. In these types of cases, park management may influence major or subtle external activities which are inextricable linked to the park. The land use of the park area itself, in addition to existing roads, power lines, pipelines, communications structures and other developments are placed on the Present Land Use Map.

On an integrated basis with the section on socio-economic use of the area, the influence of the park management upon the welfare and livelihood of local inhabitants is analyzed. It is critical to clearly demonstrate how the economy and social welfare of local people relates to that of the region and the nation as a whole.

Trends in Land Use

The foregoing section described the use of the land at the present time. This section views land use in dynamic terms. Perhaps of greatest significance to park management is the rate at which forests are being converted to open lands, wetlands are being drained or interrupted by construction, and other sites being flooded by improper groundwater management. Additional information will cover the rates of colonization within the park, the opening of mines, or the extraction of animal products.

These observations are presented to justify management activities for modifying land use to conform with park objectives.

Use of Area by Visitors

In addition to the above local resident uses, some visitors will be making use of the resources for recreation, science or education. Traditional sites for family outings, fishing, hunting and camping, and the use of the area by universities for field trips and scientific studies are described and shown on the Present Land Use Map.

Analysis of Visitors

The use of the are by visitors is projected into the future to substantiate the type and level of use to be anticipated in future periods. Special note is made of traditional holidays or festivals which include visits to the area. A projection of visitors is made to guide management decisions and the designers of activities and installations. The results of interviews and observational studies can be summarized to provide a solid statistical basis for prediction where appropriate.

STATEMENT OF SIGNIFICANCE

The foregoing description and analysis of the natural and cultural resources of the park, and the relationship of these resources to national and regional criteria for ecodevelopment and the present land use situation, will have served to build a case for justifying the planning of the area as a national park. A STATEMENT OF SIGNIFICANCE presents this justification in a concise manner.

Chapter III -- MANAGEMENT AND DEVELOPMENT -- is based upon the information and analysis of the previous two chapters. It focuses upon the objectives of the park and the programs, activities and developments necessary to achieve those objectives. Again, in addition to the narrative text, maps, figures, tables and photographs are generally useful. Chapter III would be presented as follows:

CHAPTER III

MANAGEMENT AND DEVELOPMENT

OBJECTIVES OF THE PARK	A concise presentation of the objectives of the park given orientation, scope, direction and control to the entire plan. Everything which is stated in this chapter must relate to the objectives.
LIMITATIONS AND CONSTRAINTS	A brief summary is made of the facts and assumptions which act upon the management and development of the park.
ZONING	The natural and cultural resources of the park are subdivided into MANAGEMENT ZONES which are capable of supporting particular management objectives. the zones are presented under the headings of: Intangible or Scientific Zone, Primitive Zone, Extensive Use Zone, Intensive Use Zone, and Special Use Zone. When appropriate, the Cultural Zone and the Natural Recovery Zone may be employed. For each zone, a definition, a description, specific objectives and norms or guidelines are presented in narrative form. These details are summarized in a table entitled Specifications for the Management Zones. Particular emphasis is given to the gradients of uses between the zones and to note anticipated conflicts which require special attention. The DEVELOPMENT AREAS are then presented in narrative text, and the details are summarized in a table entitled Specifications for the Development Areas. General criteria are given for the design of the physical facilities to be installed in each area. The SITES are presented where precise locations for particular activities have been assigned. The gradients of uses between the development areas and their respective zones are analyzed and guidelines are provided to minimize conflicts and abrupt changes in land use. AREA and SITE maps may be presented below along with the DEVELOPMENT

CONCEPTS for each AREA.

Each zone and development area are located on the General Development Map to be presented below.

BOUNDARIES

The zones, taken together, form a conservation unit capable of meeting the objectives. The boundary is the exterior edge of this conservation unit. The logic of the boundary decision is explained in terms of the management objectives. In addition, the boundary is described and analyzed in terms of its integrity, shape, gradient and buffering at the park's edge. Any problems to be anticipated due to abrupt changes in land use or other conflicts at the boundary are noted. And, a short analysis is presented on the more detailed location of the boundary in relation to topography, watersheds and requirements for protection. The boundaries are located on the General Development Map to be presented below.

MANAGEMENT PROGRAMS

The action elements of the plan are now presented as management programs and sub-programs, each of which is described by a MANAGEMENT CONCEPT including: objectives of the program, activities to achieve the objectives, norms and guidelines, the required inputs and the timing and value of the outputs to be expected.

Three overall programs are suggested; the number of sub-programs will depend upon the scope and intensity of management considered to be appropriate for the park. Graphics may be utilized to demonstrate specific management practices, and relations to recreation, protection and other activities.

Interpretation and Research Program

The management of the park is based upon the best possible information concerning the natural and cultural resources and the means by which these resources can serve humans in perpetuity. Park visitors benefit from research through interpretative and educational services designed to increase public awareness and appreciation about natural and cultural heritage and the environment. And, ultimately, it is necessary to monitor the progress of all activities and uses to be able to evaluate effects and results, and take the necessary corrective measures.

a) Interpretation Sub-Program	An analysis and description is made of the natural and cultural themes to be presented to visitors. Particular activities are recommended according to guidelines which consider the various characteristics of the visitors (socio-economic group, literacy, language, etc.).
b) Education Sub-Program	Various educational activities are suggested for implementation by the park. Particularly relevant are the involvement of school children and local residents in programs to provide factual information and concepts on the natural and cultural resources. The activities will also extend to the entire school system of the nation. Norms and guidelines are suggested to insure the interpretation of the park as an element of the national education system yet avoid conflicts with other objectives and activities.
c) Research Sub-Program	A management concept is made for the types of research needed to support resource management, public use, interpretation and education, and administration and maintenance. Norms are given to guide the procedures and control of the research work.
d) Cooperative scientific and monitoring Sub-Program	Emphasis is given to the kinds of activities which can be realized under various forms of cooperative agreements with other institutions. Norms are suggested for procedures on cooperative use of the park, park equipment and supplies, buildings and services. Guidelines for policy on cooperative activities by park personnel deserve particular explicit mention. Reference should be made to activities with the Man and Biosphere program, IUCN and the World Wildlife Fund, the UN

	Environmental Program's monitoring system, FAO, and other global efforts.
Environmental Management Program	The natural and cultural resources and the users of these resources require management to insure that park objectives are reached. The park ranger force is the line of authority in the area and it is this body of trained men and women which must carry out the management activities of the plan.
a) Protection Sub-Program	A management concept is presented for the protection of the natural and cultural resources of the park. Also covered is the protection of the visitor and of the capital installations in the park. This section may require considerable detail to explain the basis for management decisions.
b) Resource Management Sub-Program	The management concept describes and analyzes the kinds of treatment required by particular resources (natural and cultural). Norms and guidelines are furnished as appropriate. This section may be general or detailed according to that deemed necessary to support management decisions.
c) Recreation Sub-Program	A management concept is outlined which describes and analyzes the activities needed to meet the recreation objectives of the park. Guidelines are offered to insure the adequate harmonization of these activities with others in the park. Concerns and ideas on carrying capacity and visitor control are expressed in this section.
d) Tourism Sub-Program	A careful analysis and summary is made regarding the national policies and regional capacities for tourism to the park. Particular attention is given to the means by which tourists will visit the park, where and how they will lodge and eat, and which recreation activities are they expected to seek. Guidelines are provided on the various problems to be anticipated.

Administration and Maintenance Program

All of the work implied in the afore mentioned programs requires physical facilities, equipment, supplies, manpower, laws, policies, contracts and the like. These elements must be organized and controlled to focus on the objectives.

a) Administration Sub-Program

The administration sub-program brings all other program activities together. An Organization Diagram for the Park and a list of Numbers and Kinds of Personnel Required for the Park are presented. This section covers the training requirements of personnel. Finance and accounting capacity is designed to handle the needs of the park. The requirements for purchasing supplies, equipment, vehicles, building materials, etc., and for providing the necessary kind of storage, are described. According to the policy of the department, perhaps a section will cover the capacity to deal with contracts, corrections, public health inspection, etc. This section will deal with all matters related to the actual implementation of physical, institutional and human development, to be detailed in the integrated development program. And, the section will cover the needs for archives, library and related storage of reference materials and collections.

b) Maintenance Sub-Program

The concept is designed to insure that all capital installations (buildings, roads, and trails, radios, vehicles, boats and motors, equipment, horses and stables, etc.) are kept in running order. These activities require specialized manpower, facilities, equipment and supplies. They may also require contracts and agreements with repair shops and technical specialists outside of the department.

c) Public Relations Sub-Program

The values of the park are to be extended to the reach of citizens from the most local to the most distant in foreign countries. Among the activities are those necessary to support the park manager in working with local government, the press, the general public and particular controversial issues concerning the park. And, this section may provide ideas on possible means of fund raising for support of the park.

INTEGRATED DEVELOPMENT PROGRAM

The implementation of management activities will require some physical facilities, equipment, supplies, communications systems and transport. They will also require trained manpower and an institutional context in which to operate. Each of the above management programs has its particular needs for development. This section of the plan is designed to integrate those needs into a concise list from which redundancies and oversight have been removed. There is to be one unified development program which is totally dependent upon, and derived from, the management programs.

Development Areas

The development areas are the focal points for activities in the park. It is useful to present physical development activities by development areas in order to provide the basis for discrete packages or work and budget. In this way the value of each addition of budget can be easily examined in terms of "so much input yields so much output."

A table is presented which summarizes the development concept for each development area and is entitled *Physical Developments Required and their Respective Costs*. Such items as camp sites, picnic sites, maintenance garages, cabins, radios, roads, trails, bridges, etc., are listed in appropriate units according to development areas. The unit cost of each can be presented in a column on the same sheet. The items should meet all of the requirements of all management programs on an integral unified basis.

Personnel

The concept for staff development presented in terms of training courses, seminars, university degree programs, on-the-job training, etc. These efforts are summarized in a table entitled Development Required for Personnel and the unit cost reflect the duration and location (foreign, local) of the training sessions. This section also reflects upon career development opportunities within the park and presents guidelines for developing career advancement as appropriate.

Institutional Factors

To provide the context for the men and materials to function. Certain institutional elements may have to be developed because they do not exist in the department or because the park has peculiar needs. The concept provides recommendations for the development and contracts, agreements, concessions, laws, and policies geared to facilitate the management and development programs as stated above.

General Development Map

The management and development programs are shown graphically on General Development Map which presents a single statement of the plan. The map serves as a reference to locate all activities and facilities and to show the relationship among them all within the context of the underlying management zonation.

The map should be in a large format (approximately 60 x 60 cm) and, when possible, utilize color to indicate zones and the various symbols.

DEVELOPMENT SCHEDULE

The schedule for development places all suggested activities into order and spreads them over time. Under most circumstances the schedule will order activities and leave their time periods in a very general form due to uncertainties about when the work will begin. In circumstances of greater certainty, the timing can become quite specific. The schedule can usefully be ordered and presented in three forms: (a) a table entitled Development Schedule showing activities and events, (b) the same expressed on a Development Schedule Map of the park in which ideally each phase of work is shown in a different color, and (c) a narrative section to explain the logic in the order and flow of activities and events over time.

APPENDICES

Important supporting documents are included as Appendices to the MANAGEMENT PLAN. These will generally include a table presenting the estimated budget, the park law and related policies. The budgeting system of the country and department procedures may be followed. The ideal budget presents a summary of (a) estimated costs for physical developments (b) estimated costs for personnel development, (c) possible items and costs for institutional development, (d) estimates showing salaries at full development of the park, and (e) running costs for maintenance and amortization.

In addition, the Appendices may include maps on the development areas, vegetation, ecosystems, hydrography, geomorphology, cultural monuments and infrastructure.

Some special details may be useful such as chemical analysis of mineral waters, analysis of park visitors, archaeological restoration and lists of plant and animal species.

And, where management planning proceeds to the intensity of the site, planning, maps and drawings for park development may be included.

The document is now ready to be reproduced. The text can be run on mimeograph, multilith or other process depending primarily upon the number of copies desired and the funds available.

Maps and diagrams should be prepared by draftsmen according to cartographic, engineering and architectural standards. Similarly, photographs should receive high quality processing and printing.

It is essential that management plans appear neat and professional. One would hardly anticipate high quality management and development from a department which produces medium to low grade publications. (Unfortunately, it appears to be possible to produce fine publications and low quality management and development!)

With the desired number of copies of the planning document in hand, the next step is to give it the appropriate distribution:

b) Make a list of the individuals and institutions which warrant a copy because:

i) they must be informed so as to make educated decisions on the park issue;

ii) they may not have to make decisions on the park issue, but through their work and associations with key individuals they can influence decisions;

iii) they may be capable of informing the general public, school class and interested groups about the park proposal; and,

iv) they provided special support for the team and will receive the document as an expression of the gratitude of the team members. For example:

Office of the President of the Republic

Legislators (especially those from the district where the park lies)

Minister of Agriculture (natural resources, etc., within which the park department is located)

Heads of departments of natural and cultural resources

Ministers or directors of planning, finance, economy, foreign relations, education, tourism, agrarian reform, the sea

Military department officers (including the navy where coast, islands or open waters are involved)

National cartographic institute

University departments of natural sciences, forestry, agronomy and other related units

Professional societies of biology, forestry, engineers, etc.

Journalists and media officers of radio and TV

Nature or cultural clubs or associations

School teachers

International and regional bodies such as:

Food and Agriculture Organization of UN (FAO)

United Nations Environment Program (UNEP)

United Nations Education, Science and Culture Organization (Unesco)

International Union for the Conservation of Nature and Natural Resources (IUCN)

World Wildlife Fund (WWF)

Organization of American States (OAS)

Economic Council for Latin America (ECLA)

The relevant regional integration bodies, related sub-regional technical institutions, financial institutions and banks, related foreign universities, conservation associations.

c) Design the means for insuring the distribution of the copies of the documents to those on the list. Several guidelines apply:

i) Where possible, make the presentation of the document on a personal basis, especially to ministers and other high-level officers of government.

ii) Send copies to the relevant newspapers and media, and be ready for interviews with prepared statements on the department's intent.

iii) Where individuals are deeply interested in such documents, make sure that copies are sent both to the individual (as an individual) and the institution (as an institution). Many (perhaps most) such documents end up in private libraries. Experience shows that only the copies which are formally installed in institutional libraries remain available to the interested readers.

iv) Where it is wished that several specific individuals in a given office be given the opportunity to read (or have) a copy, it is advisable to write their names directly on the outside covers of the copies for each. Sending 20 copies under a general letter of transmittal to each office does not appear to guarantee adequate circulation.

v) Don't depend on the "system" to distribute the document. It generally does not work! The key individuals will be just the ones who never see the document. They may be the ones to decide on the budget, to open positions for new personnel, or to stop a hydroelectric project on the same site. Man-months went into making the plan, another man-week is warranted to put each copy into the appropriate hands.

Unfortunately, it is the general experience in Latin America that the planning effort loses energy at the moment the copies are received from the print shop. The team receives fulfillment from seeing their work in print, and that is understandable and deserved. But, little if anything has been accomplished until the plans are in the decision-making process. Until the minister, the local governor and mayor, the journalist, the school teacher, the general citizen, planning board officer and financial office do something, the plan remains an academic exercise. If nothing is done, the planning process will not even serve as a very useful training exercise because it will lack commitment and feedback.

vi) Therefore, put the plan in the hands of the ones who should read and act upon it; help them read it; show them slides, maps, give special slide-talks to key offices and the public. Like any marketing effort, the park proposal must be sold.

Step 12 -- Implement the Plan

The plan is now ready to be put into action. To be taken seriously, to have a legitimate claim upon public resources and to have power as an instrument to direct management and development, the plan must be placed under appropriate authority.

a) The management plan must be approved and signed by the appropriate minister or by the director of national park department.

b) The responsibility for implementation is delegated to a park manager (superintendent, intendant, project leader, etc.) giving him the necessary authority and means to carry it out. This individual should be a member of the team which prepared the plan.

c) The park manager is provided with a letter of instructions and clear terms of reference. The letter should make explicit the limits of his or her authority and to whom he or she reports. The park manager is obliged to follow the management plan. An ANNUAL WORK PLAN can be prepared from the development schedule. The manager should be given a financial account and the authority to proceed to execute activities as specified, to make the necessary purchases and employ non-career labor. Within the confines of the plan, the manager is encouraged to innovate, but not to ad lib.

The manager is especially advised to avoid opportunism which may appear beneficial but risk damaging the resource. He is encouraged to use judgment and avoid muddling around with the national heritage.

d) The park MANAGER must receive the necessary support. The manager of the park is "the person on the line." He will make or break the park. He will be rewarded for success and penalized for errors. If he is to be the manager, he deserves to be treated and supported as one. There is no middle position: He is or is not the manager. The central office (and regional offices) must face this matter and frame their attitude and treatment of the park manager accordingly. While he should work carefully with central office technical and policy-level colleagues he should be awarded some latitude for making deviations within the work plan as he demonstrates abilities of judgment and decision.

e) The management plan is the reference document for park implementation. Until modified, this document is the final word and is to be followed as such. However, the remaining steps of the planning process are designed to recognize the falability of plans and to provide for their improvement.

f) The park manager's copy of the management plan is to be mounted in a loose-leaf binder, with printing on one side of the page, and kept available for consultation by senior staff members. As the park manager and his staff consider their progress and note problems they can make annotations in the "master copy" of the management plan.

Step 13 -- Analyze and Evaluate the Plan

The analysis and evaluation of Step 9 looked at the plan in terms of its probably capacity to meet conservation and development objectives if it were to be implemented. Now, at Step 13, the plan is being implemented.

This analysis and evaluation focus upon how the plan is actually going. The life of the park manager is normally complicated by many factors: There may be problems with initiating the work, hiring staff and obtaining contracts. The university may be doing an overly detailed inventory, a foreign expert may be held up on the interpretative design due to a lack of transport, an ambassador may wish to visit the site, journalists want photographs, and supplies and equipment are arriving out of order. Perhaps concrete costs more than expected, and local colonists continue to hunt in the park.

All this is the real world of the manager. What matters are two things: First, to succeed in implementing the park; and second, to learn and share something from all experiences.

a) The park manager should review the progress and problems of the work systematically and deduce what can be learned from each experience. With the planning document at hand, the park manager and his staff can analyze each activity while it is being implemented to note if the techniques and methods are appropriate, if the material inputs serve, and if the outcome is what was expected in terms of kind, quality and quantity. It is important that this analysis is formalized in written form as memoranda among personnel or minutes from staff meetings.

b) The implications of the progress and problems upon overall park planning must be assessed. The manager and his staff evaluate the significance of the progress and problems on their work plan. Perhaps some items of work need to be speeded up or slowed down. Perhaps a method is not efficient. Maybe the prescribed inputs are unobtainable or of poor quality. The central question is: In light of the progress and problems, how can the job be done better?

c) Specific guidelines and recommendations are made concerning (i) corrective measures to be made on the work plan; (ii) amendments (additions, corrections, deepening, broadening, etc.), to be made in the management plan; and (iii) principles and fundamentals to be shared with the entire park department and other park planning and management efforts. These guidelines and recommendations are to be in written form, as specific as possible and bear reference to the management plan in all cases. There can be no analysis and evaluation without a reference point. The hind sights of the surveyor must be upon some objective which has a known location in time and space. In the park management business, it is the management plan. The dialogue runs as follows: "This is what we intended to do (and where, how, why and when we intended to have it happen). Now, what acutally did happen?" "If it's different than what we expected, why is that so?" "Is the difference worth worrying about?" "If so, then what caused the difference?"

Attention should be focused upon several common reasons for causes of the differences between what is expected and what actually happens: the resource quality and quantity are not what they seemed; human behavior was misjudged, some users compete or compliment each other in ways other than anticipated; the estimates of inputs required to yield certain benefits were under or over; costs have risen; and demands have changed.

Step 14 -- Feedback and Revise the Plan

The questions and answers from Step 13 provide the basis for immediate corrections in the annual work plan. The implementation continues, but mid-route adjustments are made. Some inquiry, however, will warrant the participation of headquarters staff and particular specialists. Deeper issues may require that changes be made in the management plan.

a) The annual work plan is corrected as necessary and without delay within the confines of the management plan.

b) The management plan can be revised as necessary, but with the participation of central office personnel and the department director. Any change in an approved management plan involves policy issues. Most critical, any single change in the plan implies a whole series of possible changes which may be beyond the conceptual and technical competence of the local park staff. For this reason it is usually only the department director's office which is authorized to amend management plans.

c) Those guidelines and recommendations which are deemed to be useful to all personnel can be formally incorporated into the training effort of the department. It is the guidelines and recommendations emanating from real life case histories which contribute to the formulation of principles and fundamentals for park planning and management. Training seminars, recycling workshops, planning manuals and future plans will all serve more usefully as a result of this feedback.

In Step 14, three loops are closed. First, the annual plan is quickly and constantly revised because the park director and his staff are prepared to learn from experience and improve their work. Second, the management plan is adjusted on a team basis to insure that a balanced and positive change is made throughout the complex plan. And third, the ultimate feedback loop is when learning is shared by all staff. In this way, the park and the park system can benefit from human experience and may improve their contribution to the attainment of conservation and development objectives.

By following the fourteen steps presented in this chapter it is possible to prepare a formal management plan for an individual national park. The method which has been suggested is derived from actual experience in Latin America in different ecological, economic, cultural and political contexts.

In most countries, planning efforts have moved on to the preparation of plans for entire systems of parks once several individual parks have been planned. Once one or several plans have been under implementation, and the complexities of operating a park department have become almost impossible, the justification for a park system plan have become obvious. Also, with the implementation of one or several parks being guided by a management plan, the benefits of a written planning document become apparent.

As was discussed in the introduction of this chapter, theory and logic point to the advantages of working from the general to the specific, i.e., to proceed from the park strategy to the systems plan to the individual park plan. Wherever this approach can be followed, such a sequence should certainly be supported.

However, from the point of view of developing the capacity of park departments to plan and implement the management of national parks it is perhaps more appropriate to approach the problem in more operational terms. That is, planning teams are formed consisting of park personnel including the park managers. The teams prepare management plans for one or several priority parks where members of the teams have actual management responsibilities. After the plans have been approved by the directors of the department, the plans are implemented with the park managers themselves held responsible for the outcome. With the learning from this type of direct experience in the field, the managers can gain the ability to consider national-level problems and possibilities rather quickly within a realistic perspective.

Chapter VI presents a suggested method for planning a nation-wide system of national parks. As with the method on individual parks, the method for park systems is derived from actual field experience in Latin America. Subsequently, in Chapter VII, a method for preparing a strategy for attaining the park system is presented. In theory, Chapters V, VI and VII could be presented in the reverse order. This would be more logical and it would represent the manner in which all park planning should eventually proceed.

APPENDIX V-A

CHECKLIST

STEPS FOR THE PLANNING METHOD FOR NATIONAL PARKS

Pre-field Activities

Step 1: Gather Basic Information and Background

a) Relate general statements of objectives for the park.

b) Gather descriptive information on the park area.

c) Gather topographic information and prepare the BASE MAP of the park.

d) Analyze the use of the park area.

e) Explain the factors which require urgent attention in the park.

f) Analyze the costs of construction in the area.

g) Review budget status of the department and the prospects for the park.

h) Review the personnel status of the department and prospects for the park.

i) Analyze the administrative, organizational, legal and political context for the new park.

Step 2: Inventory the Area in the Field

a) Survey the natural and cultural resources of the area.

b) Survey the land use and development aspects of the area.

c) Note the features of the national and regional development plans on the existing landscape.

d) Map and note those sites which warrant classification as CRITICAL AREAS.

Step 3: Analyze the Limitations and Constraints

a) List the FACTS and ASSUMPTIONS which are thought to act as limitations and constraints upon the planning of the area.

b) Prepare guidelines on the implications of each FACT and ASSUMPTION upon the planning of the park.

Step 4: State the Objectives of the Park

a) Formulate specific OBJECTIVES for the park.

b) (As far as possible) word the objectives such that they can guide management decisions, and subsequently, management decisions can be evaluated.

Step 5: Divide the Area into MANAGEMENT ZONES

a) (With the help of the resource maps and the field notes from Steps 1 - 4) identify areas where the natural and cultural resources relate to the individual park objectives.

b) Sketch each of these ten particular areas, sites or points onto a clean copy of the base map, to be called the PRELIMINARY ZONE MAP.

c) (From among the ten areas, sites or points) identify five preliminary zones.

d) Check the preliminary zone which contains the representative sample(s), ecotones and key genetic resources, in relation to the tactical guidelines.

e) Check the preliminary zone which contains the cultural resources in relation to the tactical guidelines.

f) Check the preliminary zone which contains the areas and points of interest for education, interpretation, research and monitoring.

g) Check the preliminary zone which contains the outstanding scenery and the resources related to recreation and tourism.

h) Examine the areas and points of the park which are of direct relevance to rural development.

i) Analyze the areas required for the administration of the park or which are to be utilized in ways inconsistent with park objectives.

j) Analyze the areas required for the reclamation of lands.

k) Draft the ZONE SPECIFICATIONS.

l) Identify the DEVELOPMENT AREAS and draft the DEVELOPMENT AREA SPECIFICATIONS.

m) Identify the SITES where specific activities and developments are to take place.

n) Cross-check the zoning proposal to insure adequate consistency.

o) Correct all inconsistencies in the zoning proposal.

Step 6: Draft Preliminary BOUNDARIES for the Park

a) Extend the line around the exterior of the cluster of zones.

b) Check that the boundary circumscribes a relatively self-contained unit.

c) Check the boundary for its shape.

d) Check the boundary for the gradient from park to adjacent lands.

e) Check to note whether the boundary line is practical.

f) Make the necessary changes in the boundary on the PRELIMINARY ZONE MAP.

Step 7: Design the MANAGEMENT PROGRAMS

a) Design the ENVIRONMENTAL MANAGEMENT PROGRAM.

Prepare a MANAGEMENT CONCEPT for the protection of the park and park visitors.

Prepare a management concept for resource management.

Prepare a management concept for the recreational use of the park.

Prepare a management concept for the touristic use of the park.

b) Design the INTERPRETATION AND RESEARCH PROGRAM.

Prepare a management concept for the interpretation of the park's resources.

Prepare a management concept for the educational use of the park.

Prepare a management concept for research.

Prepare a management concept for cooperative scientific and monitoring activities.

c) Design the ADMINISTRATION AND MAINTENANCE PROGRAM.

Prepare a management concept for the administration of the park.

Prepare a management concept for the maintenance of the park.

Prepare a management concept for the public relations and extension of the park.

Step 8: Prepare the INTEGRATED DEVELOPMENT PROGRAM

a) Prepare the development concept for each DEVELOPMENT AREA.

What is to be built?

What supplies, equipment and furnishings are necessary?

What infrastructure and utilities are required?

Prepare a table for each development area in which the development concept is presented.

Integrate each development area.

b) Prepare the development concept for STAFF DEVELOPMENT.

How will the employees be obtained?

How will the employees be trained for the tasks shown in the management programs?

c) Prepare the development concept for INSTITUTIONAL FACTORS.

Are the policies and laws adequate and sufficient for the new park?

Are the general regulations applicable to the new park?

Are the administrative procedures appropriate for the new park?

Is there a need to develop new interdepartmental or international agreements?

Are the laws and policies appropriate and sufficient for the new park?

d) Prepare the GENERAL DEVELOPMENT MAP.

e) Cross-check the development concepts for inconsistencies.

Step 9: Analyze and Evaluate the Proposal

a) List and present the outputs and the inputs in terms relative to the national development plan, national development policies and the programs of the national park department.

b) Compare the outputs to the objectives.

c) Compare the inputs to the constraints.

d) Compare the outputs and the inputs.

e) Accept or reject the alternative proposal.

Step 10: Design the DEVELOPMENT SCHEDULE

a) Analyze the factors influencing the DEVELOPMENT SCHEDULE.

b) Prepare the DEVELOPMENT SCHEDULE MAP.

c) Prepare the MANAGEMENT AND DEVELOPMENT SCHEDULE TABLE.

d) Prepare a SCHEDULE NARRATIVE.

Step 11: Publish and Distribute the Management Plan

a) Publish the management plan.

b) Make a list of the individuals and institutions which warrant a copy.

c) Design the means for insuring the distribution of the copies of the documents to those on the list.

Step 12: Implement the Plan

a) The management plan must be approved and signed by the appropriate minister or by the director of the national park department.

b) The responsibility for implementation is delegated to the park manager, giving him the necessary authority and means to carry it out.

c) The park manager is provided with a letter of instructions and clear terms of reference.

d) The park MANAGER must receive the necessary support.

e) The management plan is the reference document for park implementation.

f) The park manager's copy of the management plan is to be mounted in a loose-leaf binder, with printing on one side of the page, and kept available for consultation by senior staff members.

Step 13: Analyze and Evaluate the Plan

a) The park manager should review the progress and problems of the work systematically and deduce what can be learned from each experience.

b) The implications of the progress and problems upon overall park planning must be assessed.

c) Specific guidelines and recommendations are made concerning (i) corrective measures to be made in the plan of work; (ii) amendments to be made in the management plan; and (iii) principles and fundamentals to be shared with the entire park department and other park planning and management efforts.

Step 14: Feedback and Revise the Plan

a) The annual work plan is corrected as necessary and without delay within the confines of the management plan.

b) The management plan can be revised as necessary, but with the participation of central office personnel and the department director.

c) Those guidelines and recommendations which are deemed to be useful to all personnel can be formally incorporated into the training effort of the department.

APPENDIX V-B

STRATEGIES AND TACTICS TO PLAN NATIONAL PARKS FOR ECO-DEVELOPMENT

Strategy #1: Select at least one area in each of the major biotic units as functioning ecosystems in perpetuity.

Tactic #1: The area must include a representative sample of a biological province.

Tactic #2: The area must comprise one or more ecosystems capable of sustained survival and auto-regulation.

Tactic #3: The area must be managed in such manner as to guarantee that it remains perpetually in a natural state.

Strategy #2: Each representative sample of a major biological province must include the maximum possible variety and diversity found around the edges of that province and the typical or unique internal features of the area.

Tactic #4: The conservation area must include samples of the major ecotones between each biological province, biome or life zone.

Tactic #5: Management must avoid activities and developments in and along ecotones.

Tactic #6: The conservation area must include a variety of the features, sites and phenomena required for self-regulation of the area.

Tactic #7: Management must avoid activities and developments which interfere with features and phenomena upon which self-regulating mechanisms depend.

Strategy #3: Maintain areas to function as reservoirs for the genetic wealth of the nation in dynamic evolution.

Tactic #8: Sites of endemism must be included with the conservation areas.

Tactic #9: Management should avoid activities and developments which may affect sites of endemism or critical habitat requirements of rare or unique species.

Tactic #10: Conservation areas must be located to include the range of individual species.

Strategy #4: Protect, stabilize and restore objects, structures and sites of significance to the nation's cultural heritage, and provide for their study and appreciation by science and the public.

Tactic #11: Where cultural objects, structures or sites lie within natural areas, they are to be afforded appropriate protection and stabilization.

Tactic #12: Furthermore, where cultural resources lie near to natural areas, they may be incorporated to provide adequate protection and appropriate natural settings.

Tactic #13: Cultural resources are incorporated into the management of the wildland area to provide an aesthetic and consistent setting required for study and public visitation.

Strategy #5: Identify and place under management those sites, features or areas which are significant for their scenic beauty.

Tactic #14: A national park includes sites, features or areas which possess scenic qualities in addition to characteristics of significance to science.

Tactic #15: Where superlative scenic sites and features lie near to conservation area, they may be incorporated to provide them adequate protection.

Strategy #6: Each conservation area will support efforts to understand the natural and cultural resources, the transfer of knowledge to other rural development and environmental conservation activities, and the education and training of teachers, scientists, and the general public.

Tactic #16: Research activities designed to study and understand the natural and cultural resources of the area will be supported by access, facilities and services.

Tactic #17: Special sectors or zones of the conservation area should be designated to provide exclusive long-term use for scientific inquiry.

Tactic #18: Research and monitoring activities will be designed to support the management of the park, the overall development of rural lands, the training and education of scientists, students, planners, engineers and the general public, and in the preparation of educational materials.

Tactic #19: Particular facilities, activities and corresponding areas will be designed and managed for the reception, guidance, education and training of organized groups and the general public on the resources of the park.

Strategy #7: Provide opportunities for residents and international visitors to explore, enjoy and understand the natural and cultural heritage of the nation.

Tactic #20: Sectors of the park will be managed and developed to provide for a spectrum of recreation activities.

Tactic #21: The section managed for recreation will be located and developed to minimize conflicts with other park uses.

Tactic #22: Where tourism is an important activity, in conjunction with national development goals, the management and development of necessary facilities and services will be treated outside of the park boundary except where remoteness or particular circumstances dictate otherwise.

Tactic #23: Where the park is to be utilized for local recreation and international tourism, and where this involves two or more different cultural groups with largely different life styles, car must be taken to appropriately integrate the facilities, services and activities of the two user groups.

Strategy #8: National parks are to be planned and managed to support the conservation and development of rural lands, and, to the extent possible, to incorporate marginal lands.

Tactic #24: National parks are to be planned and managed in coordination with other institutions in the design, construction and maintenance of transportation and communications installations.

Tactic #25: National parks should be planned to adequately manage and protect sites which are of critical ecological or economic importance to the region.

Tactic #26: National parks should support efforts to provide stable employment by (a) providing year-round work to employees, (b) by providing supplementary work to part-time employees of other activities, and (c) by providing seasonal work opportunities to students and school teachers.

Tactic #27: National parks should design and operate educational and training services to support the intellectual and practical development of rural peoples.

Tactic #28: National parks should provide recreation services particularly designed to meet the needs of local rural peoples.

Tactic #29: National parks should incorporate marginal lands, wherever possible, to afford them stable land use and protection.

Tactic #30: National parks should support the research, development and education effort to design and foment alternative uses of marginal lands.

Strategy #9: National park management is to support water conservation.

Tactic #31: Wherever possible, watershed catchments should be included within park boundaries. While some catchments will have been included already by the analysis of previous objectives, other sites nearby may be annexed to the park to receive protection at little added cost.

Tactic #32: The research and monitoring activities of the park should place particular emphasis upon study and understanding of water resources.

Tactic #33: The education, training and interpretation programs should present this information and understanding to rural development efforts throughout the biological province.

Strategy #10. The management of the national park should control erosion and sediment to the extent possible, and relate to the security of downstream peoples, their capital and investments.

Tactic #34: Where erosion exists due to land use practices from the period prior to park establishment, appropriate means of stabilization should be applied.

Tactic #35: Where highly erosive areas lie near the park, and other wildland categories cannot manage the problem, these areas should be annexed to the park for appropriate management.

Tactic #36: And finally, all physical development and park activities are to be designed, implemented and maintained to minimize erosion and sedimentation.

APPENDIX V-C

SUGGESTED STANDARD DEFINITIONS AND GENERAL OBJECTIVES FOR NATIONAL PARK ZONES

ZONIFICACION

Una vez que se han establecido los límites, es preciso tener un sistema para evaluer y clasificar las tierras y aguas del parque. Esta acción básica de separar todo el parque en *zonas de manejo* tiene por objeto reconocer y proteger adecuadamente los recursos del parque. Como una herramienta para el manejo del recurso, indicará donde se puede colocar una innovación física e igualmente importante, dónde no debe colocarse. Una evaluación cuidadosa de las áreas apropiadas por parte del equipo de planificación proporcionará una base para juzgar muchos otros aspectos del Plan Maestro, Donde ello es aplicable, indicar las zonas apropiadas sobre el bosquejo preliminar del Plan Maestro. En la parte narrativa del Plan Maestro, definir cada zona. Describir tierras específicas del parque (calidades y cantidades) y formular los objetivos para las zonas seleccionadas. Documentar las normas para cada zona.

En América Latina, así como en otras partes del mundo, hay una creciente aceptación, por lo menos en principio, del siguiente sistema de clasificación de tierras que contempla la subdivisión de las tierras del parque en siete zonas de manejo claras e independientes:

Zona Intangible

Esta zona consiste normalmente en áreas naturales que han recibido un minimo de alteración causada por el hombre. Contiene ecosistemas únicos y frágiles, especies de flora o fauna o fenómenos naturales que merecen protección completa para propósitos científicos o control del medio ambiente. Se excluyen caminos y el uso de vehículos motorizados.

El objetivo general de manejo es preservar el medio ambiente natural permitiéndose solamente usos científicos y funciones protectivas o administrativas, no destructivas.

Zona Primitiva

Esta zona consiste normalmente en áreas naturales que tienen un mínimo de intervención humana. Puede contener ecosistemas únicos, especies de flora o fauna o fenómenos naturales de valor científico que son relativamente resistentes y que podrían tolerar un moderado uso público. Se excluyen caminos y el uso de vehículos motorizados.

El objetivo general de manejo es preservar el ambiente natural y al mismo tiempo facilitar la realización de estudios científicos, educación sobre el medio ambiente y recreación en forma primitiva.

Zona de Uso Extensivo

Esta zona consiste principalmente en áreas naturales, pero también se puede tener algún grado de alteración humana. Contiene el paisaje general y muestras de los rasgos significativos y tiene topografía y resistencia que se prestan para desarrollos viales y actividades educativas y recreativas dentro de un ambiente siempre dominado por el medio natural. Está catalogada como sector de transición entre los sitios de más densa concentración de público y las zonas sin acceso de vehículos motorizados.

El objetivo general de manejo es mantener un ambiente natural minimizando el impacto humano al recurso pero al mismo tiempo, facilitando el acceso y uso publico del área, sin concentraciones mayores, con fines de educación ambiental y recreación.

Zona de Uso Intensivo

Esta zona consiste en áreas naturales o intervenidas. Contiene sitios de paisajes sobresalientes, recursos que se prestan para actividades recreativas relativamente densas, y su topografía puede desarrollarse para tránsito de vehículos y las instalaciones de apoyo. Aunque se trata de mantener un ambiente lo más natural posible, se acepta la presencia e influencia de concentraciones de visitantes y facilidades.

El objetivo general de manejo es facilitar el desarrollo para la educación ambiental y recreación intensiva de manera tal que armonicen con el ambiente y provoquen el menor impacto posible sobre éste y la belleza escénica.

Zona Histórico -Cultural

Esta zona consiste principalmente en áreas donde se encuentran rasgos históricos, arqueologicos u otras manifestaciones culturales humanas que se desean preservar, restaurar e interpretar al publico.

El objetivo general de manejo es de proteger los artefactos y sitios como elementos integrales del medio natural para la preservación de herencia cultural, facilitándose usos educacionales y recreativos relacionados.

Zona de Recuperación Natural

Esta zona consiste en áreas donde la vegetación natural y/o suelos han sido severamente dañados, o áreas significativas de especies de flora exótica donde necesita ser reemplazada con ecología autóctona por obras planificadas. Una vez rehabilitada se asignará el sector a una de las zonas permanentes.

El objetivo general de manejo es detener la degradación de recursos y/o obtener la restauración del área a un estado lo más natural posible.

Zona de Uso Especial

Esta zona consiste en aquellas áreas generalmente de una reducida extensión que son esenciales para la administración, obras publicas y otras actividades que no concuerden con los objetivos de manejo de parques nacionales.

El objetivo general de manejo es minimizar el impacto sobre el ambiente natural y el contorno visual de las instalaciones de administración y de todas aquellas actividades que no concuerden con los objetivos de parque, minimizar distracciones al disfrute, movimiento y seguridad de los visitantes, y eliminar tales actividades que no sean de beneficio publico.

1974.
Source: Moseley, J.J., Thelen, K. D., y K. R. Miller./ Planificacioñ de Parques Nacionales. Documento Técnico de Trabajo No. 15, Proyecto FAO/RLAT/TF-199. Santiago, Chile. pp. 25-29.

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3. Wetterberg, G. 1977. Marco general para planes de manejo para unidades del sistema de parques nacionales paraguayos con aplicación práctica en el Parque Nacional Caaguazu. Documento de Trabajo No. 15, proyecto FAO/PNUD/PAR/72/001. Asunción, Paraguay.

4. Various companies produce plastic sheets, 8-1/2 x 11 inches, which hold 20, 33 mm slides each. See for example:
"Skan-a-page". Joshua Meier Division, W.R. Grace and Co. North Bergen, New Jersey 007047, USA.
In humid climates care must be taken to avoid the accumulation of excessive moisture inside of the individual slide pockets. The sheets should be stored in a hanging position within an environment which is kept dry with silica-gel or other drying agent.

5. Organización de los recursos físicos para el desarrollo ecónomico. Secretaría General, Washington, D.C.

6. Spangle, P. y Putney, A.D. 1974. Planficación de programas interpretativos, guía para la preparación de programas interpretativos para parques nacionales. Documento Técnico de Trabajo No. 18, proyecto FAO/RLAT/TF-199. Santiago, Chile.

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8. Wetterberg, G. 1977. op. cit.

CHAPTER VI

A PRACTICAL METHOD FOR PLANNING NATIONAL PARK SYSTEMS

Introduction

Planning for the management and development of individual national parks has been treated in Chapter V. Obviously, a single national park can only provide for a few of the conservation requirements of a nation. This is clear when considering that, first, natural and cultural resources lie in various places, scattered throughout the national territory. Then, the needs for water, recreation, research, flood control, genetic conservation and other wildland services differ across the landscape according to patterns of human settlement, land use, and other factors.

There is need to plan, manage and develop a series of national parks which, taken together, are capable of meeting specified conservation objectives. Two questions arise: first, how can such a series of conservation units be selected; and second, in what order are the areas to be planned and given various management and development activities? The first question will be considered in this chapter, the latter will provide the theme for Chapter VII.

Considerable experience has been gained in planning systems of national parks and similar conservation areas. The earliest systems of national parks and similar conservation areas. The earliest work began in the United States and Canada, as concern increased in the 1930's for providing adequate protection for outstanding scenic, recreational, historic and archeological resources. These concerns were subsequently formalized in surveys such as the Outdoor Recreation Resources Review Commission[1] and the Canadian Outdoor Recreation Study.[2] Both nations searched for more scientific methods from biology, geology, history, archeology, economics and related fields, to insure that the respective park systems would include representative examples of the major ecological units, landscape units and historical/archeological periods. There was considerable concern to select and establish parks in such areas before opportunities were irreversibly lost. Proposals for nation-wide systems were proposed by both countries.[3]

William Hart was among the first to publish a technical paper on systems planning.[4] Under the auspices of the IUCN International Commission on National Parks, Hart documented concepts and principles based upon the experience of selected countries. His 1966 work focused upon the needs and opportunities of systematically planning the recreational use of natural areas at the national, provincial and local levels of government.

Governments became interested in planning systems of national parks perhaps as part of the growing concern for the environment and for more orderly allocation of wildlands. By the early 1970's, systems studies were begun in Botswana,[5] Greece,[6] and in several countries of Latin America. As noted in Chapter IV, some aspects of planning park systems were actually initiated in Latin America during the previous decades. The Andean countries and Central America declared that all mountain peaks above a particular altitude (usually 2,000 or 3,000 meters above mean sea level) were *de facto* "national parks." Argentina established a network of parks along its northern and western borders as part of their colonization system for hinterlands. Colombia spent several years gathering information on areas with particular values warranting management as national parks. Peru formulated a basic model in the late 1960's whereby the first parks of the nation were to be representative of the three main biomes of the country: the coast, the Andes and the Amazonian forest.

Nevertheless, the first systematic effort to plan a nationwide network of national parks in Latin America was made in Chile[7] when a two-year period of field analysis was initiated in June 1972 by a team from the National Forestry Corporation and the FAO Regional Project on Wildland Management. Other system planning efforts were made in Brazil,[8] Colombia,[9] Costa Rica,[10] Cuba,[11] Ecuador,[12] and Peru.[13]

This chapter will present the concepts and characteristics of systems planning. Based upon the experiences of Latin America, which are summarized in the appendices, a method or procedure for planning a system of national parks is suggested. While ideally the system plan should be available before individual parks are planned, the fact is that most nations will have already planned and placed under management and development several individual parks before they initiate their efforts to plan a park system.

Three Fundamental Concepts

Among the many facets of systems planning, three concepts are considered to be fundamental: the SYSTEM, the ELEMENTS of the system, and the CONCEPTUAL SYSTEMS FRAMEWORK.

The SYSTEM, as it relates to national parks, is a set of conservation areas which when managed and developed as a whole, are capable of addressing selected national conservation objectives. Thus, for example, if a nation were to choose to manage wildlands as national parks to achieve the ten objectives suggested in Table III-1, then a park system for that country would include a series of sites and areas which have been selected and managed to meet those objectives. According to local circumstances, the country would have mountain, forest, coastal, island, marine, swamp or desert areas in the system. they would be managed to conserve natural and cultural heritage, provide recreation, educational, research and scientific services, and support environmentally sound development throughout the nation.

The ELEMENTS of the national park system are conservation units themselves. They are areas which:

a) are representative of major biomes or biological provinces of the country (grassland, montane, tropical rain forest, lowland swamps and marshes, desert, etc.);

b) contain examples of the variety of biological life in the country (species and genetic diversity, ecotones, transition zones, etc.);

c) contain rare and unique species of plants and animals and of geological formations (endangered species of plants and animals, endemic and low-density species, spectacular rock formations, caves, etc.);

d) are functionally linked to important biological, cultural or economic systems (nesting sites, whale calving areas, animal migratory routes, Pleistocene refuges, watersheds, estuaries, nutrient sources, etc.);

e) contain objects, artifacts or structures of historic or archeological importance (ruins, pyramids, burial grounds, forts, etc.); and

f) are particularly relevant to the requirements of man and his environment (watersheds for water and its uses, natural areas for research and monitoring on use and care of the human habitat, environmental regulation, areas of outstanding scenic beauty for tourism and recreation services, etc.).

The CONCEPTUAL SYSTEMS FRAMEWORK presents the concepts, criteria and norms for the selection and management of a system of areas which, when managed as an organic whole, is capable of meeting specified conservation objectives.

Such a framework will list the kinds of areas required to provide the basic capacity to conserve resources, protect genetic materials, provide recreation services, etc. Normative guidelines are given concerning the management and development of the areas such that when taken together as an orderly set of elements, all of the relevant conservation objectives can be addressed.

Perhaps most significant about these three concepts is the fact that a model of the park system can be prepared in abstraction in an orderly fashion to determine what is actually required to do the job. The use of a conceptual framework implies that critical questions are asked prior to spending scarse resources on extended field work. It implies that the park department has an image about what it is searching for and what it is trying to build. Similar to the engineering drawings utilized to guide the construction of a large building, the conceptual systems framework presents the ideal set of parks which, if actually established, managed and developed as prescribed, would be expected to produce the desired results.

The conceptual systems framework provides a procedure for addressing the two central problems of selecting park areas:

a) it provides the criteria to orient the search for an area with particular capabilities (for example, for the system to be complete, representative areas are required in the Atacama desert, the Caatinga Forest or the Caribbean mangrove formation).

b) it provides the criteria to judge the relative validity of existing parks for inclusion in the system, or alternatively, for their transfer to another category of wildlands or level of government (for example, some existing parks may not in fact meet the criteria for the maintenance of a representative sample of the biological province, and other parks might better be managed as state or municipal-level areas because their use and interest may be restricted to local scope). The first question is the "need a park, where do we find it"-type, the second is the "have a park, what do we do with it"-type. Both are common questions to any operating park department. The conceptual systems framework, or simply, SYSTEMS PLAN, provides an orderly procedure for facing those complex interogatives.

Characteristics of Systems Planning

Similar to planning the individual national park, systems planning has characteristics related to the *why*, *for whom*, *by whom*, *what* and *when* questions. There are also *strategic* and *tactical* considerations, *levels* and *intensities* of systems planning and a *context* to be kept constantly in mind.

Why make a systems plan? *The reason to make a park systems plan is to provide a scientific-technical basis for searching for and selecting the areas most suitable for meeting national conservation objectives.* Again, the corollary to this is to provide a tool for judging the relative merits of existing parks. The systems plan provides insurance against forgetting critical elements and leaving "open niches."

The systems plan is prepared for officers of the national parks department, national planning board, and other land management agencies. It also serves to orient university and research personnel, conservation organizations, and international institutions in their field work, public information and other support activities.

The systems plan is prepared by the national park department in collaboration with scientists, planners, land use economists, and specialists in recreation, tourism, water resources and related topics. Conceptual planning will only make sense if the planners are familiar with the wildlands, the natural and cultural resources, and the socio-economic and political reality of the country. The managers and scientists bring their field experience to the conceptual planning table, put their ideas into systematic order, and project their future activities back into the field.

What is planned are criteria, norms, and procedures for selecting, establishing and managing areas which together will make up the national park system. The planning effort will suggest areas for inclusion to fill in the conceptual framework, and will evaluate existing areas for inclusion or transfer to other wildland categories.

A systems plan is timely when land still remains in a wild state and there is need and opportunity to select the most important areas for permanent wildland status. The plan is useful for situations when considerable wildland remains and the problem of selection is overwhelming. The plan is also useful when few wild lands remain and there is urgency to select from among the last remaining areas. The plan will be too late when all options have closed, when there is not chance for choice remaining. To judge the validity of existing parks is all but impossible without the existence of a conceptual model against which the existing area can be compared.

Ideally, (although less possible each day) a systems plan is prepared in a preliminary form (a) before any parks have been established and (b) when large amounts of wildland are yet available. Each park area can then be justified in terms of its capability of meeting a particular set of criteria and norms (e.g., the Atacama desert park, the Caatinga forest park, the park to represent the Caribbean mangrove formation, etc.). While optimally systems planning is done prior to the establishment of park areas, the systems plan is of particular value to cross-checking existing parks and to search for open niches, redundancies, and the like.

Systems plans have strategic and tactical aspects. The strategic side of systems planning involves considerations of the national development plan, the environmental health of the nation, rural development, and the conservation of the nation's natural and cultural wealth. It also involves work with global efforts in environmental monitoring, scientific research, education, the Man and Biosphere program, the World Heritage Convention and other similar activities. When the activity turns to the details of designing particular niches in the system, and in preparing procedures for selecting and establishing specific areas to meet the criteria and norms for those niches, then the tactical side of the systems planning is being exercised. The strategic and tactical aspects which have been presented in Chapter III, and again in Appendix V-B, also serve to guide planners to the key focal points in their decision-making for planning park systems.

It is useful to recognize four levels of systems planning. They run parallel to those for planning individual parks:

1) There is the WILDLAND SYSTEM which contemplates all categories of wildland conservation units. It consists of the park system, forest system, sanctuary system, etc., and as such, is a "system of systems." The nation's wildland system, therefore, covers the greater network of conservation areas, which when taken together, are capable of providing for all of the conservation objectives which require wildland resources. The categories of parks, forests, sanctuaries, and others, each provide for particular and limited sets of objectives.

2) The NATIONAL PARK SYSTEM contemplates the network of areas capable of meeting national park objectives (shown in Table III-1). It is only part of the national conservation effort (shown in table I-1) and like other categories, requires a specialized form of management called the "national park" to meet these objectives. Countries may choose to include other categories within their "national park system" for institutional reasons. Thus, such "systems" may include biological reserves, monuments and other categories. This is a question of organization, however, which shall be explored in Chapters VII and VIII.

3) The MANAGEMENT PROGRAM SYSTEM contemplates the network of areas and activities capable of meeting the requirements for particular program elements. A given national park system will have an INTERPRETATIVE SYSTEM, EDUCATIONAL SYSTEM, RESEARCH SYSTEM, RECREATION SYSTEM, PROTECTION SYSTEM, and others. Each singles out the zones and development areas and related developments and activities which, taken together, provide for specific program objectives.

4) The DEVELOPMENT PROJECT SYSTEM contemplates the set of areas and activities which will receive direct action for physical, human or institutional development in a given time period. This system is the project phase of work. It includes the plans for construction throughout the park system, the scholarship plans for all staff, and the overall administrative procedures or reorganization required for the park system.

While the third and fourth levels of work are not typically considered to be "systems work," many park institutions have officers in charge of program areas and the implementation and control of each project for all parks of a region or for the entire nation.

Finally, there is the CONTEXT for the national park system. The national park system is, in fact, a sub-system of the NATIONAL WILDLAND SYSTEM. And, the national wildland system is part of the national land use plan, where such exists. The park system must be explained and defended with reference to this larger context if national objectives are to be efficiently met. As will be discussed in Chapter VIII, it is an unfortunate fact of life that most often the various categories of conservation areas are separated into distinct administrative departments. This creates departmental loyalties and tends to fragment the overall perspective of the wildland system and cause inefficiencies in meeting conservation objectives due to rivalries, redundancies, overlapping, and oversights. Thus, an ideal solutions would involve a single, united NATIONAL SYSTEM OF CONSERVATION AREAS which would cover the spectrum of categories and areas suggested in Chapter I.

Ideally, the CONCEPTUAL FRAMEWORK FOR THE NATIONAL WILDLAND SYSTEM should be prepared before the national park system is designed. National parks have meaning only in terms of the other alternative wildland categories established in the country, and the alternative uses of land. To pursue the ideal context of a step further, the preparation of the conceptual framework for a national wildland system is the first and most basic of documents which each country must prepare for the allocation of its wildlands prior to discussions of national parks, forests, sanctuaries, agricultural reform and hydroelectric power. Such a framework, along the lines suggested in Chapter I, would place wildland resources and their management directly into ecodevelopment.

The Method for Planning Systems of National Parks in General Terms

A review of systems planning experience from Latin America is presented in the appendices. The major systems planning efforts in Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador and Peru included a conceptual framework where ideas and principles were placed into order, where past experience was examined, and where a view to "what should be" was given. These studies then included field work to examine existing and proposed conservation areas. Some existing units did not meet the criteria, and some new park sites had to be sought. Each study made some reference to the national development plan.

From these experiences, it is now possible to deduce a practical method for planning park systems. The objective is to guide wildland planners in the selection of a set of conservation units which are capable of providing the products and services expected from the national park category of management.

The quality of the park system will depend upon many factors, not the least of which is the information available on the natural and cultural resources of the country. With limited information, a park system can be conceptualized initially from bibliographic references and maps. Individual biologists, foresters and others can contribute their wealth of knowledge to support an orderly exploration of little-known parts of the continent. Alternatively, as the intensity of field knowledge increases, the park system can become more specifically defined.

It is a fundamental premise that a park system study can be initiated in any nation, at any time, starting from available information. As information becomes more abundant, the conceptual framework can be designed more completely and the individual areas selected more specifically.

Since options to select conservation units which are capable of supporting ecodevelopment are rapidly closing, work on systems planning should be started as soon as possible. Similar to the planning of individual parks, work on systems planning is a never-ending job. The experience of countries with long traditions of planning park systems shows that with increased technological, economic and social development come new and constantly evolving perceptions and needs of man concerning his habitat.

If systems planning is to be started regardless of the information available, and if managers are faced with constantly changing human needs, then obviously there is considerable risk in this type of work. The risks come from the managers' lack of ecological knowledge, their inability to evaluate all of the factors involved in any decision on park systems, and their inability to predict human future needs from, and impacts upon the human environment. Such risks can be taken into account by managers primarily by treating openly and directly those factors about which they are unclear or uncertain, and by providing sufficient flexibility in the plans being made to absorb changes as they arise.

Finally, the term NATIONAL PARK SYSTEM carries certain ambiguity as to the kinds of conservation units to be included. Commonly, the so-called national park system includes national parks, as well as such categories as national monuments, biological reserves and wildlife sanctuaries. The categories of wildlands not included therein are covered in other management systems. However, for the purpose of presenting suggested methodology for systems planning, the term national park system will be herein considered to include only the national park category _per se_ (as designated in Table I-1 and Table III-1). that is, monuments, reserves and sanctuaries will require similar systems studies to that for national parks. For example, there can be a national monument system, biological reserve system, wildlife sanctuary system, national forest system, etc. Taken together, they collectively form the national wildland system. To the extent that various categories are combined within particular government departments, the various categories can logically be combined. The organizational aspects of park management will be discussed in Chapter VIII.

The method for planning systems of national parks will be presented in a step-by-step format, somewhat parallel to the method for planning individual parks suggested in Chapter V. As before, these steps are interrelated and interdependent, which means that the planners will find it necessary to work forwards and backwards among the steps, to check from step to step searching for consistency, and to maintain the perspective that all steps are elements of one single ultimate decision.

The systems planning procedure can be presented in seven steps:

1. Design the Conceptual Framework for the Park System
2. Study Existing Conservation Units
3. Classify and Qualify each Conservation Unit
4. Summarize the Information and propose a Draft Park System
5. Search for New Areas to Fill "Open Niches" and Propose Them for Inclusion in the Park System
6. Suggest Adjustments in and Re-allocation of Existing or Proposed Units not Suitable for Inclusion in the Park System
7 Propose the National Park System. Cross-check with other Wildland Categories and the National Development Plan.

In reality, the steps continue into decisions on PRIORITY, NATIONAL STRATEGY, and MANAGEMENT CAPACITY aspects which will be treated specifically in Chapters VII and VIII.

Step 1 -- Design the Conceptual Framework of the Park System

A large portion of systems planning takes place in the office. An office room is established and furnished to facilitate the planning effort. A team is organized which represents the related disciplines and institutions.

The team members initiate their work with a thorough review of the NATIONAL DEVELOPMENT PLAN, background information on the natural and cultural resources of the country and the existing and proposed parks and reserves.

The conceptual framework then centers upon the what, how and who of wildland management: what are the objectives of management, how will these objectives be achieved, and who will see that the work gets done?

The NATIONAL WILDLAND SYSTEM is defined by relating primary conservation objectives to the alternative means by which these objectives can be achieved. An analysis of the laws, policies and capacities of the existing institutions related to natural and cultural resources is made to determine which organizations relate most appropriately to each management category.

One alternative means to achieve the primary conservation objectives will generally be the NATIONAL PARK category which is defined and given criteria. To check the consistency, the step finalizes by cross-checking the park category within the wildland system and within the national development plan.

Step 2 -- Study Existing Conservation Units

A work sheet is designed which will guide the orderly gathering of information on each existing national park or other type of conservation unit. A sheet will be filled out during subsequent steps in the planning process to form the basic piece of information on each conservation unit.

The planning team presents a workshop for all personnel which will work in the study. The participants will come from the park department as well as other organizations to formulate and practice in the use of field methods for the study.

Particular attention is given to the logistics required to support the study of national parks which exist. The team heads for the field. As each area is visited, the field work sheet is completed to describe each conservation unit in terms of the various criteria.

Step 3 -- Classify and Qualify Each Conservation Unit

Each conservation unit is then classified in terms of the most appropriate category for its management. This will depend upon the conservation objectives which the area is capable of supporting and the combination of objectives consistent with the long-term stability of the ecosystem.

Having collected the field data for each area, the team can then qualify each unit in terms of the criteria. The team expresses the relative quality of each area in terms of each criteria on a series of charts and maps which serve to give order to rather complex decisions.

The work sheets on each park are then placed into the respective conservation unit files to be completed in subsequent steps.

Step 4 -- Summarize the Information and Propose a Draft Park System

The maps for individual criteria are layed, one over the other, to show graphically those units which qualify highly for several criteria at the same time. This information is correlated with that from the charts where each unit is qualified. From this integration of data, a summary chart is prepared which shows at a glance how each existing and proposed national park measures up to the criteria and to each other.

From all of the conservation units, those which most highly qualify for inclusion in the park system can be chosen and noted on the summary chart. Those units which were deemed not to qualify are held until Step 6.

Step 5 -- Search for New Areas to Fill "Open Niches" and Propose Them for Inclusion in the Park System

The summary chart will show "open niches" where existing conservation units do not qualify to met the requirements for a park in that particular situation, or where no existing conservation unit covers that situation. These open niches can be described in conceptual terms according to the criteria: What are the characteristics of such a site?

Specifications for each "new area" are designed on a conservation area worksheet which serves to guide the team in locating such an area in the field. Once such is found, the procedure returns to the elements of Step 3, where the team classifies and qualifies the area and places it on the charts and maps related to each criteria and on the summary chart of Step 4.

The field worksheets on the new areas are placed on the appropriate files in parallel fashion with those of existing areas.

Step 6 -- Suggest Adjustments in and the Re-Allocation in Existing or Proposed Units not Suitable for Inclusion in the Park System

Each of the areas which was rejected for inclusion in the park system is then examined. For those which were rejected because they are, or should be, managed under a management category other than national park, they may remain within the jurisdiction of the parks department but under a more appropriate category. Other units may be suggested for management under a different category and for transfer to another department of government. Some units may be combined with another to form larger blocks of contiguous wildland. In this way, most of the existing wildland units probably will remain as units of the national wildland system. Some few may pass to local levels of government such as a municipal parks department or a local historical society. Occasionally, some units may not qualify for any category, and will be recommended for transfer to a non-wildland type of use such as agriculture.

The suggestions for each conservation unit are integrated into the summary chart.

Step 7 -- Propose the Park System, Cross-check with other Wildland Categories and the National Development Plan

The information from the summary chart can be shown on a national map which is then a statement of the proposed national park system.

The system of national parks can be compared with networks of other categories of wildland management which may have been established in the country. There may be a system of national forests, wildlife sanctuaries, cultural monuments or recreation areas. Some of these other categories may, in fact, be managed as elements of the "park system" but the need for this suggested analysis holds in any case. The team searches for overlap and redundancy and notes any points of conflict for land use and the attainment of conservation objectives. The national park system should form an integral part of the national wildland system and compliment the other management categories.

Similarly, the park system is compared with the various sectors of the national development plan. Particular interest is focused upon transportation, energy, education, land use, water works, rural development policies, agricultural development and agrarian reform.

To the extent that these cross-checks have identified conflicts, the team will make the necessary adjustments to the proposed park system. In some cases it may be appropriate and necessary to suggest that changes be made in other categories of wildland or even in the national development plan rather than the national park system.

(The team then moves on to consider priorities, national park system strategy and management capacity which shall be taken up in subsequent chapters below.)

The Method for Planning Systems of National Parks in Detail

The method for planning a park system will now be presented in detail. the STEPS of the method will be divided into their component parts, in the order in which the planners should consider them. The details of the method are presented graphically in Figure VI-1 and as a check list in Appendix VI-A. The cases of Latin America from which, to a considerable measure, the method has been deduced are presented in Appendix VI-B.

It is assumed that the systems plan is being prepared by an integrated team representing several disciplines and institutions which are related to the natural and cultural resources to be studied. The plan is to be prepared within the context of regional planning and development in close cooperation with the national planning board. The budget and the staff of the park department is limited and field expeditions must be kept few in numbers and short in their length of stay. It is also assumed that the director of the park department has decided that the management of the entire network of national parks must now be studied as a whole and a plan proposed for its future development.

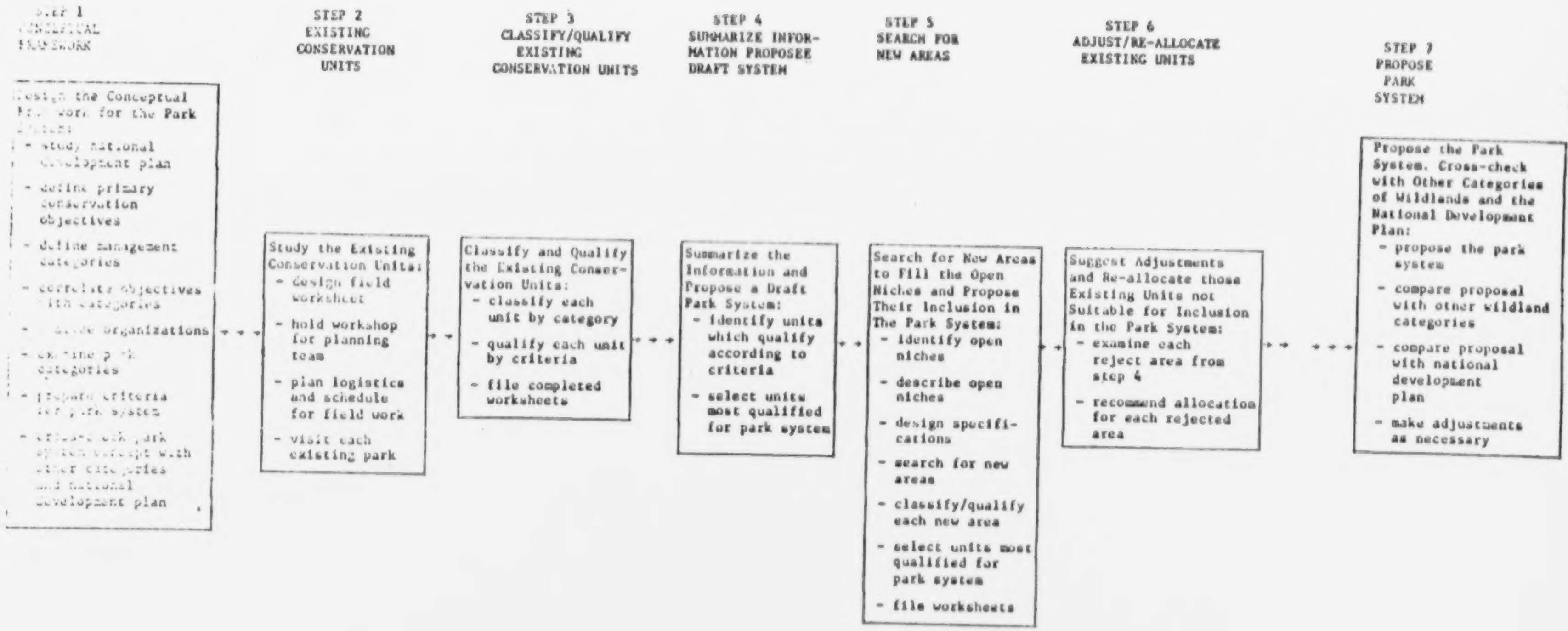
Pre-field Activities

Similar to planning individual national parks, there are several tasks to be completed prior to gathering information and sending teams off to the field.

First, a room must be established where the planning team can work. Generally the room will be located in the parks department and may be the same facility employed by the teams planning individual parks. there are cases when it may be located appropriately in the planning board building. It must be available at all times to all members of the team, be exclusive to their use (or shared with park planning teams) and provide a quiet and undisturbed atmosphere. The room should include a large table around which the team can work, meet, read maps and put together their planning documents. A file cabinet should be organized to hold information on each conservation unit to be studied, as well as general information on the other wildland categories and the national development plan. A map file should be set up to hold the topographic and other maps of the individual conservation areas, and other maps and charts to be made as part of the analysis.

Aerial photographs of each conservation unit should be collected in stereo pairs and filed in the folder for each area. A stereoscope (either table model or pocket model) should be available in the room for the study of the conservation units. Large books, atlases, and regional and sectorial plans can be kept on a book shelf.

It is suggested that the team take 35mm color slides of each area and collect slides from others who have knowledge and experience on the various areas. The slides can be filed in plastic sheets and placed in the folders for the respective conservation unit (or integrated into the departmental slide filing system if such has been developed). A 35mm projector and screen should be at hand in the room to enable the planners to review particular sites and resources whenever desirable to examine details and refresh memories.



STEP 1
CONCEPTUAL FRAMEWORK

Design the Conceptual Framework for the Park System:
- study national development plan
- define primary conservation objectives
- define management categories
- correlate objectives with categories
- [illegible] organizations
- examine park categories
- prepare criteria for park system
- cross-check park system concept with other categories and national development plan

STEP 2
EXISTING CONSERVATION UNITS

Study the Existing Conservation Units:
- design field worksheet
- hold workshop for planning team
- plan logistics and schedule for field work
- visit each existing park

STEP 3
CLASSIFY/QUALIFY EXISTING CONSERVATION UNITS

Classify and Qualify the Existing Conservation Units:
- classify each unit by category
- qualify each unit by criteria
- file completed worksheets

STEP 4
SUMMARIZE INFORMATION PROPOSEE DRAFT SYSTEM

Summarize the Information and Propose a Draft Park System:
- identify units which qualify according to criteria
- select units most qualified for park system

STEP 5
SEARCH FOR NEW AREAS

Search for New Areas to Fill the Open Niches and Propose Their Inclusion in The Park System:
- identify open niches
- describe open niches
- design specifications
- search for new areas
- classify/qualify each new area
- select units most qualified for park system
- file worksheets

STEP 6
ADJUST/RE-ALLOCATE EXISTING UNITS

Suggest Adjustments and Re-allocate those Existing Units not Suitable for Inclusion in the Park System:
- examine each reject area from step 4
- recommend allocation for each rejected area

STEP 7
PROPOSE PARK SYSTEM

Propose the Park System. Cross-check with Other Categories of Wildlands and the National Development Plan:
- propose the park system
- compare proposal with other wildland categories
- compare proposal with national development plan
- make adjustments as necessary

Figure VI-1. Schematic diagram of the suggested method for planning a system of National Parks.

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Second, the director of the parks department establishes the planning team. Working with his colleagues of related departments and organizations, the director brings together a team which is made up of the required disciplines (biologists, landscape architects, foresters, archeologists, lawyers, etc.) and includes participants from related institutions (national planning board, forest service, water resources agency, tourism, national science and technology institute, etc.). The personnel from the individual parks are included on the team while their area is under study. Generally, it is important to include representatives from local bodies near the individual parks (governor's office, mayor's office, indigenous group, agricultural cooperative, etc.).

Third, a work plan is prepared. The planning team can work most efficiently if it begins with a clear vision of what is to be produced. A suggested table of contents for the systems planning document is presented in Table VI-1. From this and the steps of planning method in Figure VI-1, it is possible to prepare a work plan such as that illustrated in Table VI-2.

Fourth, the team members divide the responsibilities for the various tasks of the planning effort. Again, this does not mean to imply a division of the team into a group of individuals, but only to distribute the work load during the office activities, field work and the final preparation of the document.

Step 1 -- Design the Conceptual Framework of the Park System

The CONCEPTUAL FRAMEWORK for the park system is developed in eight sub-steps:

First, gather and study the national development plan, the various plans and proposals for other wildland categories, and other relevant background information. The development plan is generally available either in its entirety or by sectors, covering periods of one to five years. The team should become familiar with those plans and projections which relate to the nation's natural and cultural resources such as the opening and development of wildlands, river basin schemes and tourism development. The forest, park and wildlife departments will have some form of documentation on their plans and projections for forest reserves, wildlife sanctuaries, natural monuments, etc. the historical societies and museums will have projections on the restoration and management of archeological sites. Taken together, these and other sources will provide the basis for a review of the future on other wildland categories. This is especially critical where the country has yet to develop the concept of a national wildland system as suggested in Chapter I. To this can be added information on each of the resources to be studied, the nation's transportation network, agricultural soils and their potential, timber and mineral resources, cultural resources, tourism opportunities and existing and proposed infrastructure.

Second, define the PRIMARY CONSERVATION OBJECTIVES. From the background documents and information, the laws and policies of the parks

TABLE VI-1

PARK SYSTEMS PLAN

Table of Contents

- Preface
- List of Figures and Tables
- List of Appendices
- INTRODUCTION
  - Brief overview of the nation, legal and policy factors and the motivation for the systems study. Method of study.
- CONCEPTUAL FRAMEWORK
  - Review of National Development Plan, other regional plans, proposals for all wildland categories, and related background information.
  - Primary Conservation Objectives
  - Definitions of Wildland Management Categories
  - Correlation of Objectives with Categories
  - Analysis of Wildland Management Organizations
  - Description of National Park Category
  - Criteria for National Park System
- EVALUATION OF EXISTING CONSERVATION UNITS
  - Classification of each Unit by Management Category
  - Qualification of each Unit by Criteria
- NEW CONSERVATION UNITS FOR PARK SYSTEM
  - Description and Specifications for New Conservation Units
  - Classification and Qualification of New Units
- ADJUSTMENTS AND RE-ALLOCATION FOR UNSUITABLE UNITS
  - Recommendation for Dedication of Unsuitable Units
- PROPOSED SYSTEM OF NATIONAL PARKS
  - Proposed Park System
  - Comparison of Proposed System to other Wildland Categories and the National Development Plan
  - Recommendations for Resolution of Conflicts with other Wildland Categories and with Activities of National Development Plan
- APPENDICES

TABLE VI-2

SAMPLE WORK PLAN FOR THE PREPARATION OF A SYSTEMS PLAN FOR NATIONAL PARKS

Steps	Officer in Charge
Logistics	
1. Design the Conceptual Framework of the Park System (office)	
a) national development plan and other background	
b) define primary conservation objectives	
c) define management categories	
d) correlate objectives with categories	
e) analysis of management organizations	
f) examination of park category	
g) criteria for park system	
h) cross-checks	
2. Study Existing Conservation Units	
a) design field worksheet	
b) workshop for planning team	
c) plan logistics and schedule for field work	
d) visit each existing unit (field)	
3. Classify and Qualify Conservation Units	
a) classify each unit by category (field)	
b) qualify each unit by criteria (field)	
c) file worksheets appropriately (office)	
4. Summarize the Information and Propose the Draft Park System (office)	
a) identify units which qualify	
b) select units for system	

etc...

and other resource management departments, and from interviews with political, technical and scientific leaders, the team should write down the primary objectives for conservation. In general they will include the protection of samples of the nation's ecological regions, the provision of outdoor recreation in natural areas, the protection and production of forest and wildlife products and services, and the protection and production of water resources. These and other suggested objectives have been discussed in detail in previous chapters.

Third, define the various MANAGEMENT CATEGORIES for wildland areas. In general, countries will have established several types of wildland categories such as national park and forest reserve. The legislation and policy on each such category should be gathered and studied. the objectives of each category should be determined and noted, giving particular attention to the combination of objectives which are mandated.

Fourth, correlate the primary conservation objectives with the management categories. A matrix such as that idealized in Table I-1, is prepared on which the primary objectives of conservation can be related to the various management categories. Through this technique the team can search for redundancies and omissions. By comparing the provisions in the existing laws and institutions with those suggested in the ideal matrix of Table I-1, the team can note the strengths and weaknesses of their situation. In most cases, the national park will be relatively well defined while other categories will be vague, overlapping and incomplete. In most cases, there will be an obvious absence of categories to provide for various objectives and combinations of objectives. It is common to find that the national parks will be expected to yield more kinds of services than is advisable if such areas are to be committed to long-term ecological goals.

Fifth, analyze the organizations related to the management of wildlands. the forest, park and wildlife departments will already be established in most countries. They will have laws and policies as well as established practices and traditions. The team should analyze each organization to determine the competence and capacity of each in legal and practical terms. Is there an organization ready and prepared to manage each type of category which is necessary to meet the nation's conservation goals? ONe institution may be capable of managing several categories. For some categories there will be no existing organization. Should a new one be established? Or can an existing one be expanded to incorporate the new activity?

Up to this point, questions have concentrated on what needs to be done (the primary conservation objective), how to accomplish the needs (the management categories) and who is to see that the needs are met (the organization). This analysis provides the basic framework for the nation's wildland resources. Within this larger framework lie the national parks.

Sixth, examine the national park category. The specific objectives for the national park category were noted in the fourth sub-step above. This identifies the category as unique in the types and combinations of services to be produced. Normally, this should correspond to the definition and the criteria for national parks as suggested by IUCN.

Seventh, prepare CRITERIA for the national park system. From the objectives, definition and criteria for national parks, *per se*, the team now develops criteria for a network of national parks. The criteria should begin with the objective and specific and proceed to the more subjective and general.

The first criteria should consider the ecological regions of the country, ecological diversity and genetic wealth. A national park should be established in each ecological region (according to the proposed schemes of Dasmann, Uvardy, Holdridge or other locally utilized method of ecological zonation).[14]

The second criteria should focus upon land forms, landscape types or geomorphological regions. A national park should be established in each major geomorphological region of the country (volcanic, mountain, coastal, desert, swamp, glaciated, etc.). An accepted method of classification should be utilized.

Following these two fundamental criteria, which can be treated objectively and be well documented, several subjective but also essential criteria can be considered:

Potential for Recreation
Potential for Education
Potential for International Tourism
Necessary Size and Shape to Meet the Objectives
Quantity and Quality of Cultural Characteristics
Special or Outstanding Scientific Features
Special or Outstanding Aesthetic or Scenic Features
Special Opportunity to Support Rural Development
Absence of Anthropomorphic Alteration of National or Cultural Resources
Feasibility of Management

With all of the criteria described, the team then prepares maps on the ecological regions and the geomorphological regions to provide the first schematic layout of the niches which conceptually should be filled by national parks. That is, there should be a park in each ecological zone and each geomorphological zone. Then the remainder of the criteria are considered to more specifically define the niches to be filled.

Eighth, cross-check the CONCEPTUAL FRAMEWORK for the park system with other wildland categories and the national development plan. The conceptual framework defines the objectives, the management methods and the organizations to take charge. It identifies the role to be played by national parks and defines the criteria for a system of national parks. Before stepping forward into field work and the identification of specific areas, it is wise to re-examine these ideas in relationship to (a) the other categories of wildland management, and (b) the various sectors of the national development plan. If the parks were to be organized and developed in the manner suggested by the framework, would they lie in conflict or be complementary to other wildland categories? All overlap and omission should be evaluated and suggestions made for possible solutions. Would such a park system conform to the plans for transportation development in the rural areas of the country? Does the national plan provide for scholarships and training for officers in natural resource management? Are there plans for reorganizing governmental departments? Where will the responsibility for park management fall?

The conceptual framework for the national park system can be considered to be ready when it can be discussed as an integral part of the national development plan. A good test of its validity is to review it with officers of the various resource management agencies and the national planning board and request their comment. Strategically, the framework should be welcomed by the national planners and accepted as an additional tool for development. It is the expression of the park department's determination to put a shoulder to the national development effort. At this point, conservation becomes unmistakably a part of development.

Step 2 -- Study Existing Conservation Units

The study of each conservation unit in the country is treated in four sub-steps:

First, design a FIELD WORKSHEET. The team designs a simple sheet which guides the orderly inventory and study of each area to be visited. It is useful to have the sheet reproduced by mimeograph and copies given to each team member. In this way the materials gathered and the questions asked will be standardized even as members of the team change. A sample WORKSHEET is shown in Table VI-3.

Second, hold a workshop for the planning team. Prior to initiating field work, it is wise to give all members of the team the opportunity to fully understand the nature of the problem and the method to be followed. With the conceptual framework in written form, the accompanying maps and the field worksheet, the team members are given instruction on how the survey will be carried out. Each member is to become thoroughly familiar with the framework, the criteria and the worksheet. In principle, each member is to know what he is searching for before he finds it! Useful exercises can be developed for the workshop. For example, the members can be asked to describe an area which would fill a particular niche in the framework. For example, what would one look for in seeking a prospective site for a national park in the Atacama desert ecological region? In other words, how would one recognize something one may have never seen? What questions would one ask the local rural people met on the trail? How would one know when one found a representative sample of the Atacama desert?

As a scenario of this step in the systems planning process, the team can be imagined sitting around a table in the planning office. Maps of the nation's ecological and geomorphological regions are on the wall. Perhaps there are also maps of the national development plan, the

TABLE VI-3

SAMPLE FIELD WORKSHEET

Basic Information

Name of Area:
Location:
Reference Number in File:
Approximate Area (ha.):

Analysis of Resource

Biological Province (Biogeographical Province, Life-zone, etc.):
Terrestrial Habitats (Communities, Ecosystems, Formations, etc.):
Aquatic Habitats:
Marine Habitats:
Endangered Species (flora, fauna):
Geology/Geomorphology:
Scenic Resources:
Unique Objects or Phenomena:
Watersheds:
Soil Erosion:
Ecological Diversity (ecotones):
Special Genetic Resources:
Other:

Potential Use of Area

Products (wood, meat, seeds and fruits, water, fodder, etc.):
Services (research, erosion control, recreation and tourism, etc.):

Institutional Factors

Existing Land Use:
Land Tenure:
Projected Activities for Area:
Present and Proposed Infrastructure (roads, communication, etc.):
Particular Land Use Conflicts:
Required Cooperative Activities Among Various Institutions:
Feasibility of Management:
Feasibility of Protection:
Activities Requiring Urgent Management and Protection:
Legal and Policy Factors:

References (literature, film aerial photographs, individuals, etc.):

the archeological areas, the soils, potential land use, and a forest type map. The various criteria are listed on a blackboard. Individual team members take the floor, asking their colleagues to describe the characteristics of the idealized site in each ecological region. Another will probe on the landscape regions; another on rare, unique and outstanding resources. Then they begin to combine characteristics: a representative rainforest site, covering ecological diversity, including the genetic wealth of the lowland swamps, providing habitat to several endangered species, including the genetic wealth of the lowland swamps, providing habitat to several endangered species, including the potential for recreation and tourism developments, and insuring the protection of the water regime for the valley. They construct "models" of the national parks to be sought.

Third, plan the logistics and schedule for field work. The team has a list of the existing (and proposed) national parks. They also have a preliminary idea concerning the number and location of open niches which must be surveyed. With these expectations they are in a position to plan the logistics for their field work. Some sites can be visited by vehicle, others by canoe, still others by mule or on foot. Some sites can be visited quickly because of easy access, others will require minor or major expeditions. These plans will need coordination with regional and local offices, district foresters, regional planning officers, and the sources of transport. Knowing the sites to be visited and the mechanics required, the team can prepare a schedule for their field work. Depending on how many individuals can be made available for periods of time, the team will have to budget their limited time carefully and realistically. Some sites can be visited by local field officers in the company of a few representatives of the central planning team. In many cases, the list of areas to be visited can be divided into geographic or topical regions, and then delegate to sub-teams which carry out the field work and report back to the central team.

Fourth, visit each existing park. The team's first priority is to know the parks which are already functioning and to describe them in terms of the criteria for the park system. In many cases the existing parks will qualify. In most cases, the existing parks will need to be adjusted in territory or program to meet the broader framework now considered appropriate for national parks. For example, some parks will not include the entire upper watershed upon which they depend. Others will exclude portions of the habitat requirements of endangered or representative species.

Then there are proposed parks which already were identified and plans were being made for their management and development prior to the park systems study. There is still time to influence their management and development. Although they are still in the early planning stage, commitments probably have already been made. For practical purposes, these proposed parks are considered to be already in existence.

The field worksheet is filled out for each park. Do they meet the criteria of the park system? Are they "national parks" according to the conceptual framework, or would they be managed more appropriately as national forests or other category? Maybe they are called "parks" and yet managed as national forests. This is the moment to be critical about objectives and means for management. Perhaps the area would make an excellent park if the upper watershed could be incorporated within the boundaries. Is it feasible to incorporate the upper watershed?

Step 3 -- Classify and Qualify Conservation Units

After each unit has been visited and described, the team can proceed to the key analytical steps of classification and qualification. Detailed examples are shown in Appendix VI-B.

First, classify each unit in terms of the most appropriate category for its management. What objectives can each area meet? Which combination of objectives? The team considers each site and determines the appropriate category for each on a sheet such as that illustrated in Table VI-4.

Second, qualify each unit in terms of each criteria. Charts are prepared upon which ratings are assigned for each criteria for each particular site. A model chart and procedure for assigning ratings is suggested in Table VI-5. Each site is also located on maps showing the ecological and geomorphological regions and possible other criteria which lend themselves to mapping.

A scenario of this step imagines the team under a tree or in a rustic lodge. They consider each area, one-by-one, discussing and debating the relative merits and problems of each. To give perspective to the debate, it is useful to compare and contrast the merits of one site relative to another. Which is a better representative of the ecological region? Why? The team leader places the ratings on the chart (in pencil, because he will generally need to return to modify previously assigned ratings).

Third, place the completed field worksheets in the files on conservation units. The worksheets are completed with the information on classification and qualification. The sheets are to be filed in the individual folders on the conservation units in the office. It is generally wise to duplicate these sheets, making one a permanent office copy and the other for field use.

Step 4 -- Summarize the Information and Propose the Draft Park System

On completing Step 4, all existing and proposed parks will have been surveyed and evaluated. Some will have been set aside because they should be considered as elements of another management category. Some will remain, albeit they require some adjustments and replanning. This information is now synthesized to provide a basis for the first draft of a proposed park system.

First, overlay the maps and correlate information from the charts to identify units which qualify highly for one or several criteria. By superimposing the maps of the location of existing parks, ecological

TABLE VI-4

SAMPLE SHEET FOR DETERMINATION OF CATEGORY

	◍	◍	○	◍		○	○	○	○	○	○	○
	◍	◍	●	◍	◍	◍	●	●	●	●	●	●
	◍	◍	●	◍		●	●	●	●	●	●	●
	◍	◍	◍	◍		◍	○	○	◍	○	◍	○
	●	●	●	●		◍	●	◍	●	●	○	◍
	●	●	●	●		◍	●	◍	●	●	○	◍
						◍	◍					○
	◍	○		○		◍	○		◍	●	●	○
						◍		○				○
	◍	○				●			○		◍	○
	◍	◍	●	●		●	●	●	◍	◍	●	●
					◍	◍						◍
	●	●	●	●	○	◍	◍	●	◍	●	●	◍

●
●
○

Source: FAO. Wildland Management, A Programme for Environmental Conservation in Latin America. Documento Técnico de Trabajo No. 4, Proyecto FAO-RLAT/TF-199, Santiago, Chile, 1974.

regions, geomorphological regions and other criteria, it will be possible to identify those units which fall within each region. By referring to the details of the qualification chart for each criteria, it is possible to identify those units which best represent the ecological region, the geomorphological region and one or more other criteria.

Second, select those units which best qualify for the park system. A summary chart is prepared, such as that suggested in Table VI-6, upon which the ratings given to each park are noted. The name of each park is listed, each park is rated in terms of how it represents each particular criteria, and notes and recommendations are made concerning the quality of the park and the steps required to improve its quality in terms of the criteria.

Some of the niches in the chart will remain vacant, and be examined later. Those parks which were not qualified will be examined in Step 6.

The summary chart presents the first statement of the national park system. It is preliminary and generally incomplete, but it tells what is desired, what is already available, and what is still missing.

Step 5 -- Search for New Areas to Fill the Open Niches and Propose their Inclusion in the Park System

The team now concentrates on the missing parts of the park system.

First, identify the open niches in the summary chart. From the chart, it will be easy to note that particular ecological and geomorphological regions lack representation in the system. Or, that while the ecological or geomorphological regions are represented, other criteria are not covered. It is useful to draw circles around these niches on the chart with colored pencil. The team now faces a reversed situation. Previously, they had parks and queried what to do with them; now, they know what to do with the parks, but they don't have them!

Second, describe each open niche conceptually, in terms of the criteria. As with the practice exercises during the training workshop, the team now described each open niche in conceptual terms. They note the ecology, geology, and other features which ideally they are interested in locating.

Third, design specifications for each new area, as per the worksheet. The descriptive information is then placed on an empty worksheet, one for each site. The sheet describes and specifies the kind of area sought and can be shared with field officers around the country. Such a sheet can be sent off to a district forester who has participated in the training workshop. It will guide them to check out the wildlands in his district and save considerable travel cost.

Fourth, search for new areas in the field. By using the worksheets which specify the ideal site being sought, field officers in each respective region can make a preliminary search. The field officers can

TABLE VI-6

SUMMARY OF ANALYSIS AND EVALUATION OF NATIONAL PARKS IN TERMS OF ALL CRITERIA FOR INCLUSION IN THE NATIONAL PARK SYSTEM

ESTABLISHED NATIONAL PARKS	AREA (ha)	Criteria A	B	C	D	E	F	G	H	I	J	SUGGESTIONS AND COMMENTS
National Park #1	500,000	1	1	2	1	3	1	2	3	1	3	Specific recommendation on management of each area.
#2	100,000	2	1	3	3	3	1	2	2	1	1	
#3	25,000	3	2	1	3,	2	2	2	1	3	2	
#4	3,000					etc...						etc...
#5	250,000											
#6	35,000											
#7	25,000											
#8	7,500											
#9	etc..											
#10												
etc..												

Key: 1 = Excellent
2 = Good
3 = Acceptable
4 = Inadequate
5 = Missing information
6 = Does not apply

nominate sites which to them appear to fulfill the requirements. Where no field personnel exists, or where they have not been trained in the procedures, it will be necessary for the central office personnel to make the search. Each nominated area is then described on a clean field worksheet as in Step 2.

Fifth, classify and qualify each new area. As per Step 3, each new area is classified as to its appropriate management category, and qualified in terms of the various criteria. This information is recorded on the maps and charts for existing areas.

Sixth, select those new areas which qualify for the park system. Parallel to step 4, those new areas which qualify to fill the open niches are selected and added to the summary chart.

Seventh, place the completed field worksheet from new areas in the files on conservation units. the field worksheets from the new areas are now completed, including information on their classification and qualifications. They are placed in folders in the file cabinet in duplicate.

Step 6 -- Suggest Adjustments and Re-Allocation of those Existing Units not Suitable for Inclusion in the Park System

Existing or proposed national parks which were found acceptable for inclusion in the park system have been considered. The open niches which remained have been filled. There remains the question of those existing park sites which were rejected for inclusion in the park system because they were considered to be more appropriately managed under another management category, or because of their low qualifications in terms of the criteria.

First, examine each rejected area from Step 4. Examine and discuss their objectives, appropriate management category, and relative merits and problems. Suggestions can be made for (a) annexing them with existing parks; (b) assigning them to the parks department and managing them under another category within the department's legal jurisdiction (for example, natural monuments); or (c) re-assigning them to another organization to be managed under another category; or ultimately, (d) re-assigning them to a non-wildland use category such as agriculture, urban parks or intensive tourism development.

Second, place the suggestions for each rejected area on the summary chart. To insure that this information is appropriately utilized, it is wise to maintain the rejected areas on the same summary sheet as illustrated in Table VI-6. They will remain parts of the park system de facto until they are actually transferred. They can often be employed to negotiate land exchanges with other public agencies or private land owners. In any case, they are not to be forgotten suddenly; and, they remain integral parts of the current on-going park system until their future management can be implemented.

Step 7 -- Propose the Park System. Cross-check with the Other Categories of Wildlands and the National Development Plan

First, propose the park system. The summary chart now contains a complete statement of the proposed parks system. It includes the acceptable existing areas, the new areas to be established, and the rejected areas which shall be held until their future management is secured. A map can be usefully prepared to show the proposed system in relation to any or all of the criteria. The summary chart and the final map can be drafted in clean form to be included in the PROPOSED PARK SYSTEM document. The text need not be elaborate and can follow the table of contents represented in Table VI-1. However, before going to the printing press, it is important to run several final checks on the proposal.

Second, compare the proposed park system with other wildland management categories. Make sure that the park proposal does not conflict with the existing national forests, sanctuaries and other categories. This was done in an abstract form during Step 1 when the conceptual framework was being developed. Now it is repeated in terms of specific areas on the map. To the extent that parks can be surrounded by forests and linked with sanctuaries and monuments to form large aggregate blocks of managed wildlands, there will be complimentarity, and it is wise that the team recommend that such action be taken. In some cases, however, it will become apparent at this late stage that conflict is inevitable because there may be timber resources, water works or mineral deposits, in or near the areas suggested for inclusion in the park system.

Third, compare the proposed park system with the National Development Plan. It is useful to run a last check on the relationship of the park system to the various sectors of the development plan. It is particularly important to avoid surprises several months later when conflicts arise because of obvious antagonisms which were ignored carelessly. The map of the proposed park system can be overlayed with maps of the proposed transportation network, power line network, water works, agricultural colonies on new lands, forestry concessions, mining developments, new urban developments, etc. There will be no excuse for conflicts which ignore these proposals. Parks generally seem to lose any battles for land of this type.

Fourth, make adjustments as necessary. Where conflicts are noted, and where they can be noted and studied before physical development projects are implemented, it can often be possible to influence planners, developers and owners to change their plans. On the one hand, the park team will have to recognize those cases where the battle for a first priority site may probably be a losing battle; they may save scarce resources by selecting the second-level priority site immediately, thereby avoiding the losses of conflict. On the other hand, there are battles worth waging, where the stakes are very high or when the odds favor the park department to succeed. The proposed plan for the national park system is modified accordingly, and the maps and charts are modified.

At this point, attention has been given to planning individual national parks and nation-wide systems of national parks. Both of these efforts have been set within the context of ecodevelopment in which national parks can form vital elements. The next problem for the park department is to schedule their work on the implementation of the park system over the next decades. As with the problem of scheduling management and development activities for individual national parks, the scheduling of activities for an entire park system involves the weighing of the key variables which influence the park department.

Attention now shifts from parks and natural and cultural resources to men, material, and money. Chapter VII focuses upon political strategy, and the pragmatics of when to implement important activities to carefully and deliberately build a system of national parks.

APPENDIX VI-A

CHECKLIST

STEPS OF THE PLANNING METHOD FOR NATIONAL PARK SYSTEMS

Pre-field Activities

Step 1: Design the Conceptual Framework of the Park System.

a) Gather and study the national development plan, the various plans and proposals for other wildland categories, and other relevant background.

b) Define the primary conservation objectives.

c) Define the various management categories for wildland areas.

d) Correlate the primary conservation objectives with the management categories.

e) Analyze the organizations related to the management of wildlands.

f) Examine the national park category.

g) Prepare criteria for the national park system.

h) Cross-check the conceptual framework for the park system with other wildland categories and the national development plan.

Step 2: Study Existing Conservation Units.

a) Design a field worksheet.

b) Hold a workshop for the planning team.

c) Plan the logistics and schedule for field work.

d) Visit each existing park.

Step 3: Classify and Qualify Conservation Units.

a) Classify each unit in terms of the most appropriate category for its management.

b) Qualify each unit in terms of each criteria.

c) Place the completed field worksheets in the files on conservation units.

Step 4: Summarize the Information and Propose the Draft Park System.

a) Overlay the maps and correlate information from the charts to identify units which qualify highly for one or several criteria.

b) Select those units which best qualify for the park system.

Step 5: Search for New Areas to Fill the Open Niches and Propose Their Inclusion in the Park System

a) Identify the open niches in the summary chart.

b) Describe each open niche conceptually, in terms of the criteria.

c) Design specifications for each new area, as per the worksheet.

d) Search for new areas in the field.

e) Classify and qualify each new area.

f) Select those new areas which qualify for the park system.

g) Place the completed field worksheets from new areas in files on conservation units.

Step 6: Suggest Adjustments and Re-Allocation of those Existing Units not Suitable for Inclusion in the Park System.

a) Examine each rejected area from Step 4.

b) Place the suggestions for each rejected area on the summary chart.

Step 7: Propose the Park System. Cross-check with the Other Categories of Wildlands and the National Development Plan.

a) Propose the park system.

b) Compare the proposed park system with other wildland management categories.

c) Compare the proposed park system with the national development plan.

d) Make adjustments as necessary.

APPENDIX VI-B

SUMMARY OF SYSTEMS PLANNING EXPERIENCE IN LATIN AMERICA

Many parks of the Latin American region were chosen because of their intrinsic and individual values in plant, animal, scenic grandeur or recreation resources. Each selection was a discrete decision, site-by-site, as the area came to the attention of the park department. Often, the sites represented "what was left," or "what was still wild." As reviewed in Chapter III, the size and shape of these areas has sometimes been governed by ecological principles, but often the existing boundaries which are found today are the results of pragmatic factors contingent on what was then available and possible.

Two extremes are often cited and placed into confrontation; first, there is the scientific or technical optimum -- the utopian or ideal; and, second, there is the possible -- what really works. The first is often discounted and replaced by the second. As has been demonstrated in previous chapters, such a procedure of pure pragmatism runs the risk of developing parks which are biologically and economically insignificant -- they may be green, but they soon will be silent![15]

Argentina was the first country where strategic thinking for the selection, management and development of national parks is documented.[16] The large parks, such as Glaciares, Iguazu, Lanin, and Nahuel Huapi, were established and organized as elements of development programs along the borders with Brazil and Chile. There is not doubt that the parks warrant park status for their intrinsic values, but in addition, they have formed parts of a national strategy for rural development and defense.

Other countries including Colombia, Costa Rica, Ecuador, and Mexico gave legal status as national parks to all lands rising above a particular contour (above mean sea level). These laws affected primarily volcanos and mountain peaks, and unlike the Argentine approach where parks were instruments of development programs, the "contour line approach" was basically impractical and ignored. Subsequently, volcanos like Cotopaxi (Ecuador), Purace (Colombia), and Volcan Poas (Costa Rica), have become operating national parks because of their intrinsic values.

Greater scientific bases for systems planning were provided in Argentina, Colombia, Chile and Venezuela as local biologists began to analyze the biogeography of the respective nations. Among others, scientists such as Hugo Correa Luna and Milan Dimitri (Argentina), Jorge Hernandez and Carlos Lehman (Colombia), Carlos Munoz Pizarro (Chile), and Henri Pittier (Venezuela) provided many of the basic kinds of information upon which national parks were subsequently selected. The criteria of the scientists were understandably specialized, yet there is every reason to believe that the early pioneers of park management actually formulated park systems models combining the scientific criteria with social and economic considerations. Their ideas were informal, unwritten, unspecified. Unfortunately, many of these early ideas did not usually form part of management and development strategies to the extent that they could germinate and see the light of day.

Colombia initiated a new trend in Latin America. In the early 1960's the officers of the Agrarian Reform Institute (INCORA) and the Magdalena Valley Corporation (CVM) prepared written proposals for the establishment of a network of parks for the lower Magdalena basin. For the first time, the work of scientists, foresters, agronomists and development planners was wed into a regional view. The subsequent establishment and management of the Tayrona, Salamanca Island and Sierra Nevada National Parks were products of these early pragmatic yet technically sound ideas (see Figure II-4).

Since that period, the officers of the National Park Division of Colombia have been compiling and searching for areas to be added to the national park system. The first statement of the potential national system was not published until 1976.[17] A series of areas were mapped and described, with particular interest given to their biological and geological importance. The areas were examined in terms of their representing the nation's biological provinces, major habitats, and rare and endangered species of plants and animals. The strategy was that as funds and personnel permitted, the Division would explore and evaluate each area in terms of biological interest, effective integrity and manageability. In many of these areas, it was expected that a national park, reserve or sanctuary would be proposed.[18]

While the criteria were not articulated in written form, this effort represents one of the first attempts in Latin America to explicitly set forth a park system strategy for a nation. Most significant is the graphic and narrative presentation which facilitates debate, discussion, challenge and improvement, and leads to eventual policy and budgetary decisions. Without such a written document, the great expenditure of energy would have remained dormant and of utility to a limited group which probably would exclude the individuals in key decision-making positions.

A decided shift in systems planning took place in Chile, Costa Rica, Cuba, and Peru, and more recently in Ecuador and Brazil. The turning point came first in Peru where already in the mid-1960's a conceptual framework was being developed before the actual establishment of parks. Early officers from the General Forestry and Wildlife Directorate, the Forestry Faculty of the National Agrarian University "La Molina," and the FAO Forestry Project, along with Ian Grimwood, a consultant from the British Ministry of Overseas Development, articulated the concept of one large park each in the coast, Andes and Amazonian regions.[19] This basic concept has now been implemented as shown in Figure VI-B-1 with the establishment and management of Paracas National Reserve, Huascaran and Manu National Parks in the three respective biomes. While there is a myriad of ecological life zones and biological provinces in the country, the strategy focused limited resources upon one large conservation unit in the three "macro zones." Since that time, the Peruvian park officers have been establishing

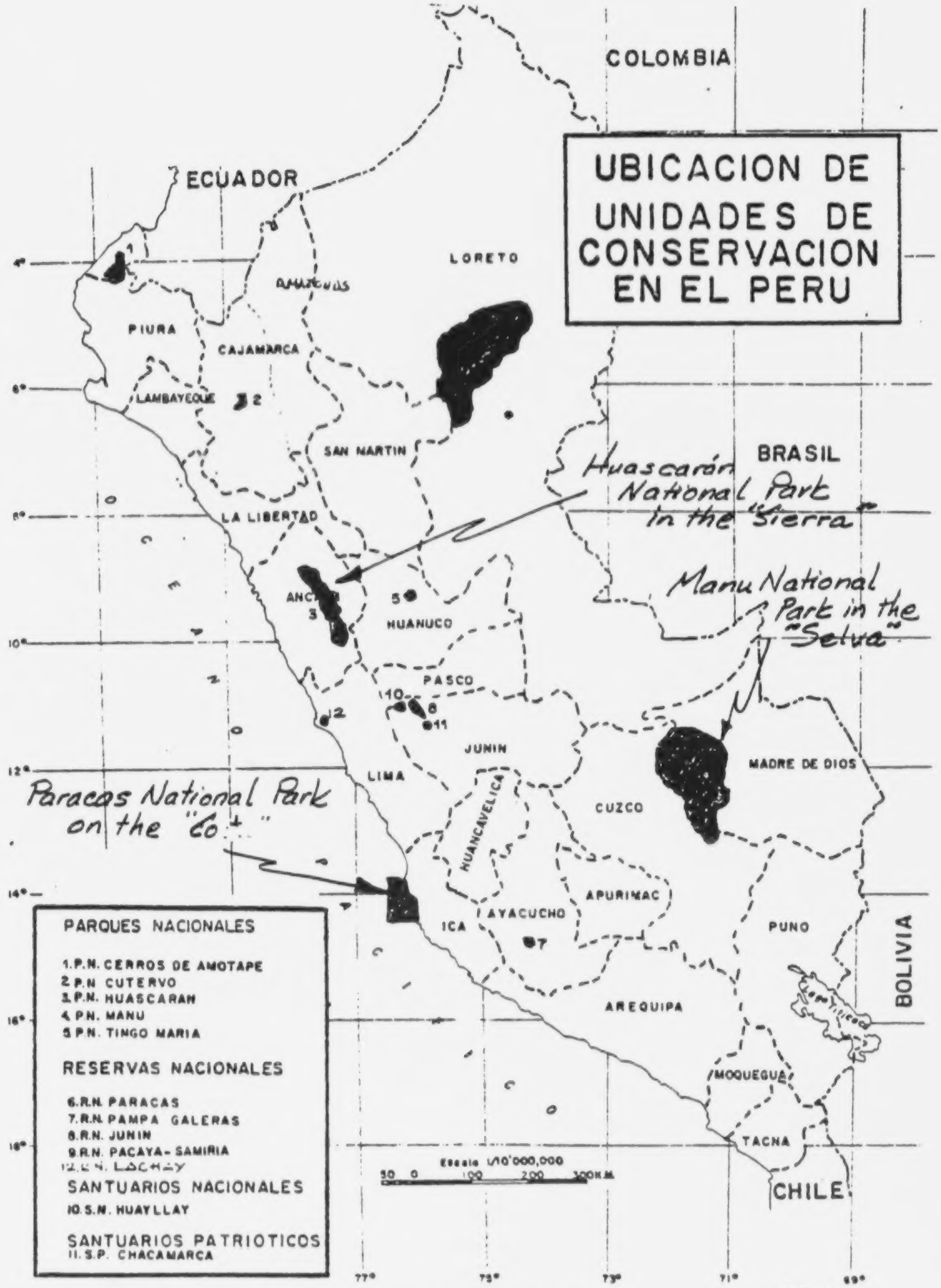


Figure VI-B-1. A system of conservation areas in Peru was initiated with one large unit in each of the three major ecological regions of the country -- Costa, Sierra and Selva. Subsequently, some nine conservation areas have been added to the system.

Source: Direccion General Forestal, Peru, 1976.

additional parks and reserves in other areas to cover the great ecological variation of the nation.

Costa Rica faced a slightly different context. Some relatively large tracts of wildland were found when interest in national park implementation began in the late 1960's. Most of the remaining natural areas were small and scattered. The practical strategy employed by the newly forming park service in the early 1970's was (a) to identify the remaining wildland areas, (b) to check these areas with the local scientists and their work (L.R. Holdridge, J. Tosi, the various professors of the University and the Organization for Tropical Studies Program, and others) and (c) to study each area in terms of its integrity and manageability. This effort led to the nomination of the first national parks -- Santa Rosa, Volcan Poas, Tortuguero, and Cahuita, shown in Figure VI-B-2. They each represented a major biome of the country. Subsequently, the Costa Rican Park Service has been filling in the system to include coverage of the natural and cultural heritage of the country. While a written park systems plan has not been prepared to date, the Park Service in cooperation with the FAO Regional Project on Wildland Management has elaborated a wildland system framework containing criteria, norms, policies and guidelines for national parks and other categories.[20]

The system studies in Cuba, Chile, Ecuador and Brazil differ from previous efforts in that they not only developed conceptual models for systems of parks, but also gave explicit consideration to social, economic and political factors.

The study in Cuba presented a conceptual framework for the conservation of natural and cultural heritage for the country, and suggested procedures for a national inventory, area planning and institutional and managerial development. Within a context of the traditional efforts of economic development characterized by the production of food, health services, education, housing and transport, recognition was given to the growing concern for the habitat of man as an integral part of the modern approach to development.

The study was the first attempt to articulate PRIMARY CONSERVATION OBJECTIVES, the premises for the CONSERVATION OF NATURAL AND CULTURAL HERITAGE, and the ALTERNATIVE CATEGORIES OF WILDLAND MANAGEMENT at the national level. (Many of these concepts were simultaneously published elsewhere,[22] and have already appeared in Chapter I.)

Of particular significance for this Chapter are the recommended procedures for a NATIONAL INVENTORY OF NATURAL AND CULTURAL RESOURCES. Generally, there is an urgent need to assemble and synthesize information on the areas, sites and objects which warrant conservation management. While inventory commonly implies a complete survey of botanical, marine, geological and other resources, the obvious but seldom implemented type of inventory brings together and classifies information which already exists and does so in a form which is useful to guide national parks and national planning and development officers.

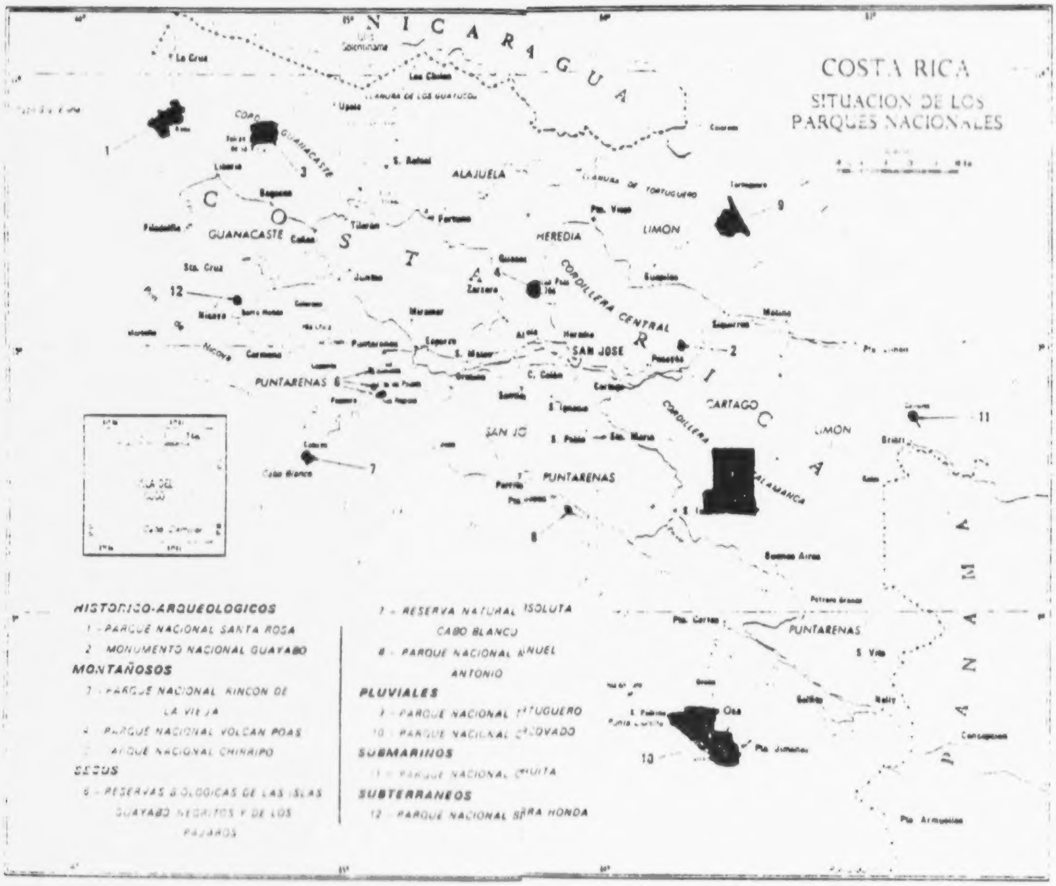

COSTA RICA
SITUACION DE LOS PARQUES NACIONALES
NICARAGUA
COSTA RICA
PANAMA
GUANACASTE
ALAJUELA
HEREDIA
LIMON
SAN JOSE
CARTAGO
PUNTARENAS
CORDILLERA CENTRAL
HISTORICO-ARQUEOLOGICOS
1 - PARQUE NACIONAL SANTA ROSA
2 - MONUMENTO NACIONAL GUAYABO
MONTAÑOSOS
3 - PARQUE NACIONAL RINCON DE LA VIEJA
4 - PARQUE NACIONAL VOLCAN POAS
5 - PARQUE NACIONAL CHIRRIPO
SECOS
6 - RESERVAS BIOLOGICAS DE LAS ISLAS GUAYABO NEGRITOS Y DE LOS PAJAROS
7 - RESERVA NATURAL ABSOLUTA CABO BLANCO
8 - PARQUE NACIONAL MANUEL ANTONIO
PLUVIALES
9 - PARQUE NACIONAL TORTUGUERO
10 - PARQUE NACIONAL CORCOVADO
SUBMARINOS
11 - PARQUE NACIONAL CAHUITA
SUBTERRANEOS
12 - PARQUE NACIONAL BARRA HONDA

Figure VI-B-2. The system of conservation areas in Costa Rica began with units of dry forest/savannah, vulcanism, lowland and swamp forest, and coral reefs/coastal forest. Subsequently, units have been added to cover other major environments of the nation.

Source: Servicio Nacional de Parques, Costa Rica, 1978.

Ten steps were suggested for implementing the inventory:

First, an exclusive office room needs to be established in which all information, maps and files are to be kept on the areas of natural and cultural wealth.

Second, the facilities of the planning office room should be available to all related institutions and individuals. It may be useful that the office be established within the national planning board's building, and placed under the responsibility of a NATIONAL INTERAGENCY COMMISSION which directs and coordinates the effort.

Third, the interdisciplinary/interagency planning team begins the study of each established conservation area by examining the aerial photographs and other information in the planning office. Often, pre-field work judgements will suffice to reduce expensive and time-consuming field trips.

Fourth, a special file folder will be developed for each area in which field notes, aerial photographs and relevant documentation should be kept. Bibliographies of related literature should be filed in the area files, and the larger books and pamphlets kept on separate shelves following normal local library techniques. The file folder is the central focal point for each area and should be the only place where all of the information known about an area is kept. The files can then be coded to the exact location of the area on a very large scale national map hanging on the wall of the same room. At a glance, a particular site can be located on the wall map, the number ascertained, and further information found in the file cabinet. The bibliographic list of related literature will direct the investigator to the library materials. Similarly, a slide file will be useful, and can be tied to the central files and wall map by a simple code number system.

Fifth, the large wall map of the country will serve to locate the individual natural or cultural sites, relate them to other programs and develop projects, and establish the classification of natural and cultural resources. The technique is to overlay the entire wall map of the country with a set of transparent sheets of plastic upon which notes can be made with various colors of wax crayon. Each transparent sheet (overlay) will carry a particular kind of information; biological province, historic sites, watersheds, critical habitats, present land use, transportation system, mineral deposits, hydrological and water works, urbanization, etc. Onto the final, outermost sheet the system of natural and cultural areas will be drafted.

Sixth, criteria are then established for the selection of conservation areas. These considerations have already been elaborated in Chapter I. Additionally, several criteria should guide the selection of areas where two or more appear to be of equivalent value. For example: Choose the area which

a) has the largest and most diverse ecological system;

b) is the easiest to protect;

c) has potential boundaries which lie with the natural landscape, such as along watershed divisions;

d) has the least problems in terms of current or potential land use; and,

e) has adjacent lands which have the least potential influence to provoke conflicts and contamination upon the area to be conserved.

Seventh, following a preliminary field inventory and evaluation of each individual area, and having filed the information appropriately, the next step is to cross-check the integration of the sites among themselves:

a) Review the list of sites in relation to each of the primary conservation objectives. Each objective should be identified with one or several sites. Each site should be identified with one or more objectives.

b) Recommend the choice of the most appropriate sites where repetition occurs; suggest the transfer of the unselected sites to the most appropriate alternative land uses.

c) Recommend the search for sites to fill open niches.

Eighth, all of the areas are then integrated into a conceptual NATIONAL SYSTEM OF NATURAL AND CULTURAL AREAS. The draft national system is now sketched in the outermost overlay of the maps. The draft system suggested in Cuba is shown in Figure VI-B-3.

a) Cross-check to assure that the areas are interrelated and interdependent, containing the critical habitats and key points and key functions for national environmental conservation.

b) Cross-check the areas with overlapping objectives to examine the compatability of possible management for multiple purposes.

Ninth, the natural and cultural areas are then examined for their compatability with the surrounding and adjacent lands. Each area is related to the surrounding region by roads, hydrological systems, air flow, and obviously by man himself.

a) Cross-check the management practices being utilized on adjacent lands to examine compatability with the conservation unit.

b) Where incompatabilities arise, consider the provision of adequate buffer areas within the conservation unit.

c) Harmonize the areas with the transportation routes, water works, and other development activities which could

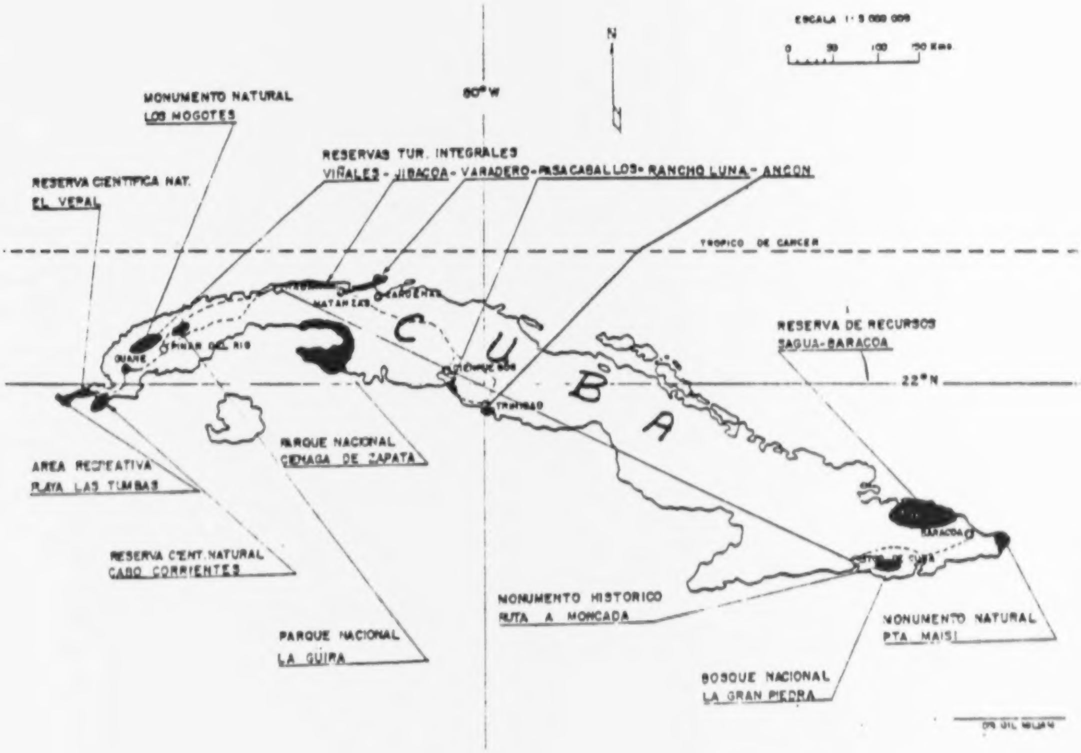


Figure VI-B-3. The draft system of natural and cultural areas for Cuba suggests a preliminary set of conservation units for management. These areas contain some of the major natural areas which remain, and also integrate key historical sites of national importance. By following the suggested methodology, additional areas can be added to the system and be in harmony with eco-development.

Source: Miller, K. R. 1974.

affect the ability of each area to contribute to conservation objectives.

Tenth, and finally, the planning process for each area is initiated. Utilizing the already presented criteria and description of the various management categories, each area is classified by category by the interagency commission which then recommends the assignment of each unit to the most appropriate government organization (according to established laws, policies and public administrative plans). The agency entrusted with one or more management categories will then be charged with proposing management and development plans for each unit (as per Chapter V).

The study in Cuba also suggested that the conservation units be linked to particular programs of national development, as for example, the national programs on education, science, weather forecasting, environmental monitoring, cultural recreation, and tourism.

In Chile, beginning in 1972 under a cooperative program with the FAO Regional Project on Wildland Management, the National Forestry Corporation wished to address the problem of how best to employ their limited manpower, equipment and annual budget. Fifty national parks had been created over the years since 1926 and the current status and value of many of these areas in relation to actual guidelines for national parks in Chile was unclear. Their names and locations are presented in Figure VI-B-4.

A two-year study was initiated to review the current national parks and to propose a strategy for the management of the areas as elements of a national park system. The published document[23] opens with a "General Framework for the Management of Natural and Cultural Resources in Wildlands," which sets the stage for the reader to understand and share the policy under which the wildland planners and managers did their work:

1) The analysis and evaluation of each of the established areas, and of their planning as national park areas or other wildland conservation categories, requires an integrated-interdisciplinary team which is prepared and equipped to work in the field.

2) The team requires support from government officers and individuals to supply information on land use, infrastructure, local and national policies related to the area, and the historical background of past decisions regarding the allocation of natural and cultural resources in the area.

3) The team requires logistical field support as well as supplies and drafting materials in order to prepare and reproduce their reports.

4) The areas should be studied, analyzed and evaluated, and subsequently established, managed and developed as national parks or other types of conservation categories, as an

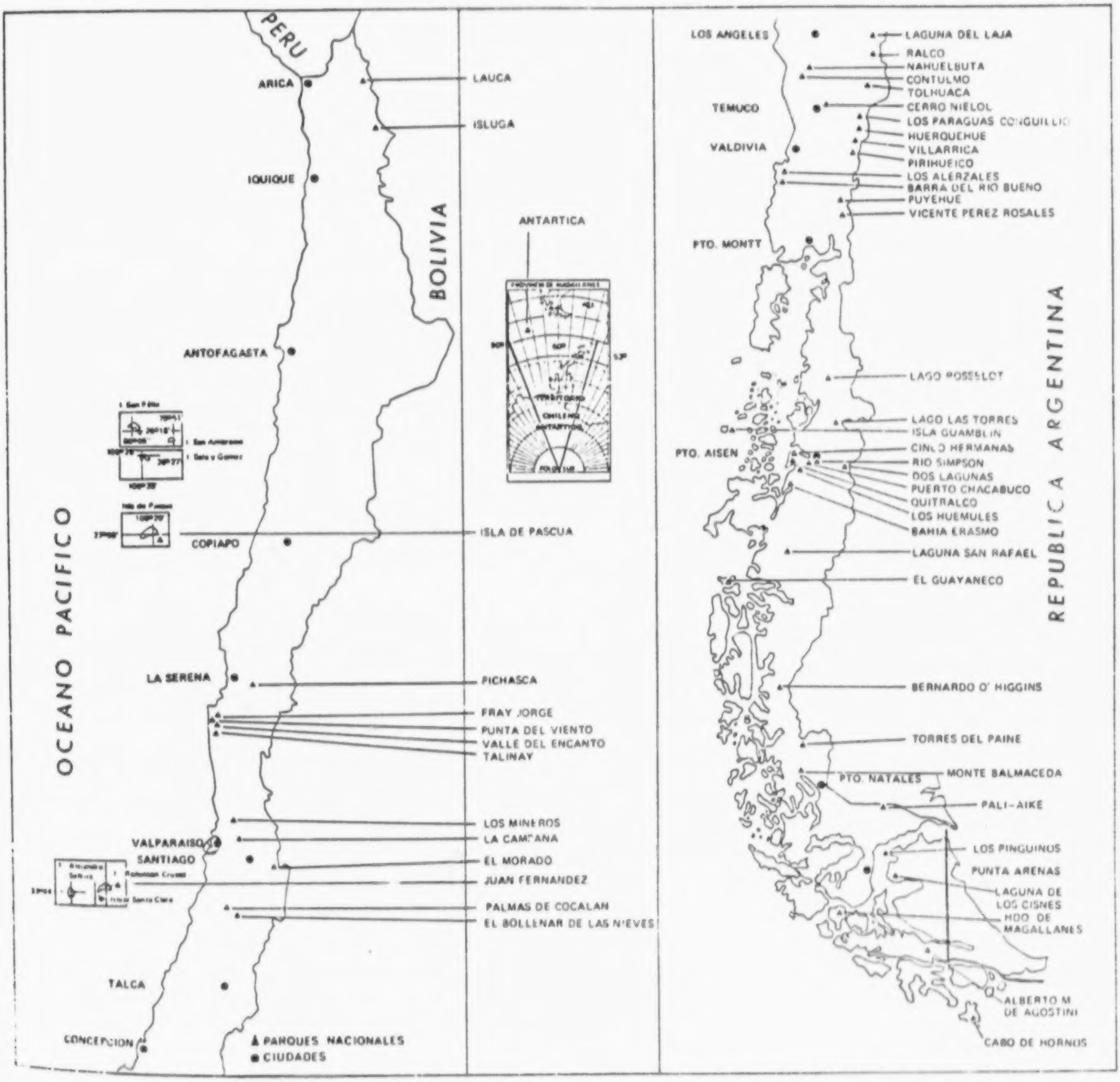


Figure VI-B-4. Since 1926, 50 national parks had been created in Chile by the time the study on systems planning was initiated.

Source: Thelen, K. D. and K. R. Miller, 1975.

> integral part of regional planning. National parks are inextricably linked to rural development and to environmental conservation and should be considered in terms of national conservation objectives, and of social, economic and political factors.

The team initiated its activities whenever possible by participating in regional-scale programs where natural and culturally rich sites formed elements of larger development questions. In this way, they worked along side of agricultural, forestry and water specialists, archeologists, and land use planners. Portions of the wildland resources would remain in one of several wildland management categories. taken together, these wildland areas would form elements of the NATIONAL SYSTEM OF WILDLANDS.

Parallel to this study, the National Forestry Corporation and the national FAO Forestry Project (UNDP/FAO/CHI/10/526) studied the network of national forest reserves in the country.[24] Together with the Forestry Faculty of the Austral University a Management Planning Handbook was published.[25]

The park systems planning team centered around a small group of Chilean professional foresters and park officers, and FAO specialists in park and wildland management and planning. The Chilean experience warrants being shared because it addresses the kind of situation which exists in many countries.

The method employed in Chile from 1972 through 1974 to define a proposed national park system began with the development of a conceptual framework. A set of CRITERIA were established to identify, classify and qualify specific areas as national parks. While the criteria were developed from international definitions and guidelines (such as the IUCN Definition and the FAO Declaration of Principles, presented in Chapter III), they were interpreted and adjusted to reflect national goals, development plans, terminology in the Spanish language, and cultural values.

Eleven criteria were established:

1) Representativeness of a Natural Ecological Region[26]
2) Representativeness of a Geomorphological Unit[27]
3) Aesthetic Quality of the Terrestrial and Marine Landscape
4) Potential for Recreation and Education
5) Potential for International Tourism
6) Necessary Size to Meet the Objectives Contemplated for a National Park
7) Absence of Anthropomorphic Alteration on Resources
8) Cultural Characteristics
9) Outstanding Natural Features
10) Scientific Value
11) Feasibility of Management

The team then visited each established (and proposed) national park. Field work was coordinated with regional and local staff of the

National Forestry Corporation and related public institutions, and it involved their direct participation in the analysis and evaluation. Each area was identified, classified, and qualified in terms of the eleven criteria. Special attention was given to the problems and the potentials of each area to meet the objectives of national parks as set forth in the "General Framework."

To evaluate the characteristics of the areas, the team found itself dealing with both objective and subjective judgements. This problem was overtly recognized by designing a procedure for systematically cross-checking and cross-referencing decisions: The ratings given to a particular characteristic of a given park were compared to those suggested for the same characteristic in other, already evaluated parks; the parks were likewise continually compared in terms of their characteristics, problems and potentials. Thus, inconsistencies in ratings were sought and adjustments were made.

The results of the field analysis and evaluation were presented on two charts. The first related the areas to the ecological regions of the country as shown in Table VI-B-1; the second, related the areas to the geomorphological units as shown in Table VI-B-2. Along the horizontal axis of each is located the list of national parks which for reasons for simplicity of presentation, only shows those areas which were highly qualified. On the vertical axes are listed the classes of ecological regions in the case of Table VI-B-1, and the geomorphological units in the case of Table VI-B-2. In the body of the matrices the numbers serve to rate the quality with which the area represents the particular ecological or geomorphological class.

Theoretically, it was considered to be ideal to have at least one park to represent each class. However, it became apparent that in some cases no representative could be found which met the other criteria of national parks. In other cases, adequate protection could be afforded to a representative sample of the class by other than the national park form of wildland management (natural monument, forest reserve, etc.). Similarly, while an area may receive a high rating for its ecological quality in terms of representativeness of a particular class, it may not possess the other qualities necessary for national park status. For example, in cases where the recreation potential may be very low, the area might better be managed as a biological or scientific reserve. And finally, while there was an effort to insure that one sample from each class was protected as a national park or other perpetual wildland management unit it was recognized that there was justification for several or even many parks or other protected areas in order to adequately provide management for the variation and diversity of natural resources, as well as for the economic and political objectives related to distribution of services in terms of demography, urbanization and rural development.

In the right hand column of each matrix, specific observations and suggestions are made for implementation in order to insure that adequate representation is attained in the park system.

TABLE VI-B-1

EVALUATION OF THE NATIONAL PARKS OF CHILE ACCORDING TO THEIR REPRESENTATION OF ECOLOGICAL REGIONS

CALIFICACION POR REPRESENTACION
DE LA REGION ECOLOGICA EN EL PARQUE NACIONAL

1. Excelente
2. Buena

* Parques propuestos en Regiones sin representación, o Parques existentes a combinarse.
Nota: Se necesita profundizar los conocimientos ecológicos en la mayoría de las áreas para refinar el estudio.

REGIONES ECOLOGICAS DE CHILE	PARQUES NACIONALES QUE REUNEN EL CRITERIO ECOLOGICO																			SUGERENCIAS Y COMENTARIOS
	LAUCA	• ATACAMA	RAPA NUI (ISLA DE PASCUA)	FRAY JORGE	LA CAMPANA	JUAN FERNANDEZ	• STGO. ANDINO	• TALCA ANDINO	NAHUELBUTA	LOS PARAGUAS/CONGUILLIO	VILLARRICA	• ALERZALES/BARRA DEL R. BUENO	• PUYEHUE/V.PEREZ ROSALES	• YELCHO	• LAGUNA SAN RAFAEL	• PAINE/O'HIGGINS/BALMACEDA	• PALI-AIKE/JOHN FELD	ALBERTO M. DE AGOSTINI	• ANTARTICA	
A Desértica Litoral																				Se sugiere el establecimiento de un Monumento Nacional en el norte de Antofagasta para proporcionar representación ecologica.
B Desértica Interior																				Se sugiere el establecimiento de un Monumento Nacional que representa el desierto absoluto, cerca de Taital. También debe establecerse como reserva científica un oasis en el área.
C Tropical marginal		1																		Se sugiere el estudio de un área en los alrededores de San Pedro de Atacama en busca de un lugar para ser manejado como parque nacional.
D Tropical Andina	1	2																		La región está representada por el Parque Nacional Lauca. El establecimiento del Parque Atacama podría contribuir a la diversidad de la representación ecológica.
E Mediterránea Per–árida																				Se debería crear un Monumento Nacional que represenla el "matorral"
F Mediterránea Arida				2																Se daria mayor proteccion y representación por medio de la ampliacion del Parque Nacional Fray Jorge.
G Mediterránea Semi–árida					2															El Parque Nacional La Campana proporcionara una representacion parcial de esta region.
H Mediterránea Sub–húmeda							2	2												Se proponen los Parques Nacionales Santiago Andino y Talca Andino para esta region. Ademas, se propone un área recreativa nacional al sur de Valparaiso.
I Mediterránea Húmeda								2	1											El Parque Nacional Nahuelbuta y el propuesto Parque Talca Andino proporcionarán la representacion de esta región.
J Mediterránea Per–húmeda									2	2										Esta región está representada por los Parques Nacionales Nahuelbuta y Los Paraguas/Conguillio.
K Oceánica con influencia Mediterránea											2	2	1	1						Esta region es grande y diversa. Estaria bien representada con el manejo del Parque Nacional Villarrica, la combinacion de los Parques Alerzales y Barra de Rio Bueno, y de Vicente Pérez Rosales y Puyehue, y el establecimiento de un Parque en Chiloé.
L Oceánica Templada Fría															1					La región está representada por el Parque Nacional Laguna San Rafael. Además se propone el establecimiento de reservas cientificas.
M Oceánica Sub–antártica															1			1		Ademas de la representación dentro de los Parques Nacionales Alberto de Agostini y Laguna San Rafael, se sugiere la creacion de varias reservas cientificas en las islas.
N Oceánica Trasandina																1	2			Se recomienda la ampliación y combinación de los Parques Nacionales Pali-Aike y John Feid, y la combinacion de los Parques Torres del Paine/Bernardo O'Higgins/Balmaceda.
O Andina							1	1												Es necesario crear dos nuevos Parques Nacionales, Santiago Andino y Talca Andino, para asegurar la representacion ecologica en esta region.
P Antártica																			1	Se recomienda el establecimiento de un parque nacional en el continente Antartico.

Source: Thelen, K. D. and K. R. Miller, 1975.

TABLE VI-B-2

EVALUATION OF THE NATIONAL PARKS OF CHILE ACCORDING TO THEIR REPRESENTATION OF GEOMORPHOLOGICAL REGIONS

CALIFICACION POR REPRESENTACION DE LA UNIDAD GEOMORFOLOGICA EN EL PARQUE NACIONAL.

Evaluación de la Calidad de Representación
1. Excelente
2. Buena

* Parques propuestos en Unidades sin representación o parques existentes a combinarse.

NOTA: Se necesita profundizar los conocimientos geomorfologicos en la mayoría de las áreas para refinar el estudio.

	PARQUES NACIONALES QUE REUNEN EL CRITERIO GEOMORFOLOGICO																			
UNIDADES GEOMORFOLOGICAS	LAUCA	• ATACAMA	RAPA NUI (ISLA DE PASCUA)	FRAY JORGE	LA CAMPANA	JUAN FERNANDEZ	• SANTIAGO ANDINO	• TALCA ANDINO	NAHUELBUTA	LOS PARAGUAS/CONGUILLIO	VILLARRICA	• ALERZALES/BARRA DEL RIO BUENO	• PUYEHUE/VICENTE PEREZ ROSALES	• YELCHO	• LAGUNA SAN RAFAEL	• PAINE/B O'HIGGINS/BALMACEDA	• PALI-AIKE/JOHN FELD	ALBERTO M. DE AGOSTINI	• ANTARTICA	SUGERENCIAS Y COMENTARIOS
A. Cordones Andinos Pre–Altiplánicos	1	2																		Representacion suficiente proporcionada por el Parque Nacional Lauca y el propuesto Parque en el área de Atacama.
B. Cordilleras y Sierras Transversales del Complejo Montañoso Andino–Costero																				Se sugiere la determinación de un área para establecer un Monumento Natural en esta unidad.
C. Cordillera con Abundante Retención Crio–Nivel							1	1		2										Para obtener una representación suficiente se sugiere el establecimiento de los propuestos Parques Nacionales Santiago Andino y Talca Andino ademas del Parque Nacional Los Paraguas/Conguillio.
D. Altiplano		1																		Se sugiere la determinación de un área en los alrededores de San Pedro de Atacama para ser manejada como Parque Nacional.
E. Precordillera Solevant	2																			Es necesaria la ampliación del Parque Nacional Lauca para proporcionar una adecuada representación.
F. Precordillera de Apollo								2												Se sugiere el establecimiento del propuesto Parque Nacional Talca Andino
G. Gran Fosa de los Salares Prealtiplánicos	1	1																		Ademas de la representación en el Parque Nacional Lauca, se sugiere el establecimiento de un parque propuesto para el área de Atacama.
H. Plano Inclinado Arido																				Se sugiere la determinación de un área para establecer un Monumento Natural en esta unidad I.
I. Gran Pampa Central																				Se sugiere la determinacion de un área para establecer un Monumento Natural en esta unidad.
J. Planicie Costera				1								2								Se podría obtener representación por la ampliación del Parque Nacional Fray Jorge, y por la unificacion de los Parques Alerzales y Barra del Río Bueno.
K. Cuencas del Llano Central					2		2													Solamente podría obtenerse representación parcial dentro del Parque Nacional La Campana y por el establecimiento del propuesto Parque Santiago Andino.
L. Cordillera de la Costa					2				2			2						1		Se podría proporcionar representación adecuada en los Parques Nahuelbuta, La Campana, Alberto de Agostini y la unificación de Alerzales y Barra del Río Bueno.
M. Cordillera Volcánica										1	1		1							Representación adecuada en los Parques Los Paraguas/Conguillio, Villarrica y Puyehue/Vicente Pérez Rosales.
N. Cordilleras Patagónicas con Ríos y Lagos														1		1				Seria adecuada la representación con la unificación de Torres del Paine/Bernardo O'Higgins/Balmaceda, y el establecimiento del propuesto Parque Yelcho.
O. Cordilleras Patagónicas Insulares																				Representación adecuada en los Parques Laguna San Rafael y Alberto M. de Agostini
P. Cordilleras Patagónicas Continentales															1			1		Representacion adecuada en los Parques Laguna San Rafael y Alberto M. de Agostini
Q. Meseta Central Antártica																			1	Se sugiere el establecimiento de un Parque Nacional en la Antártica.
R. Llano Central																				Se sugiere el establecimiento de un Monumento Natural o un Area Nacional recreativa para incluir representación de esta unidad
S. Tierras Bajas de la Estepa Fría Magallánica																	1			Se sugiere el establecimiento de un propuesto Parque Nacional que seria el resultado de la combinacion de Pali–Aike y John Feld.
Zona Peninsular Antartica																			1	Se sugiere el establecimiento de un Parque Nacional en la Antártica.
U. Ventisqueros Patagónicos del Pacífico															1	1		1		Representación suficiente en los Parques Laguna San Rafael, Torres del Paine/Bernardo O'Higgins/Balmaceda y Alberto M. de Agostini

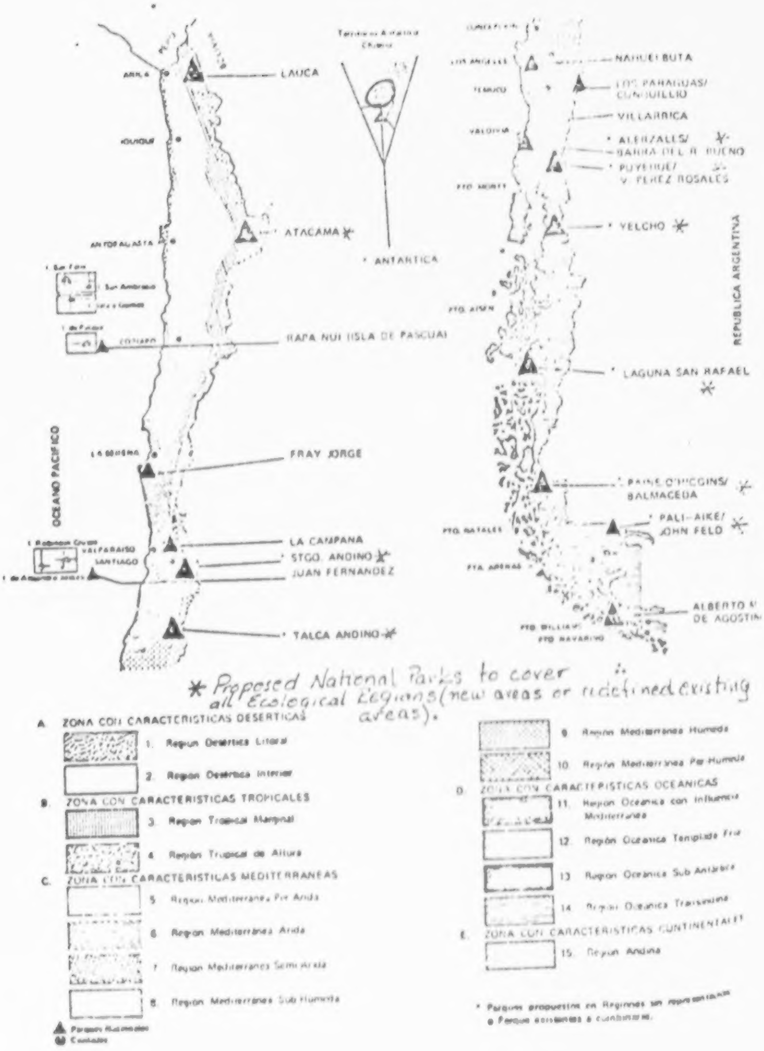
Source: Thelen, K. D. and K. R. Miller, 1975.

Thus, the decision procedure initiates from a base of relatively objective, ecological and technical factors and follows towards the less specific and more subjective. The first commitment is to insure adequate representation and protection of the ecological regions and major land forms of the country. These concepts are taken in both static and dynamic terms: for example, to include plant assemblages and plant succession, both volcanoes and vulcanism. The individual area was then checked to insure adequate potential for providing recreational and educational services to the domestic public. Tourism in this case was given relatively high priority but secondary in importance to domestic recreation. Since many of the areas had man-caused alteration, this factor was carefully reviewed but not given such high priority as to remove most if not all possible park lands from consideration. More restricted considerations of cultural, natural or scientific value added richness to a particular area. Finally, manageability was carefully weighted in terms of the possibility of actually achieving the stated objectives, given the resources of the area under consideration and taking into account the realities of ecology, economics and politics in the local region. Obviously, it is in this latter consideration where the participation of local authorities, professionals, farmers, fishermen or woodsmen can be invaluable.

In the event of several alternative candidate areas within any one ecological region and perhaps within any one geomorphological unit, favor would be assigned to that area which carried higher ratings in the subsequent criteria. And, whereas an already established park may have high ratings in ecology and geomorphology but be limited in terms of recreation potential, or for use in education and science due to the lack of lands suitable for the necessary access and development, it may be possible to enlarge the established park in order to provide the natural capital necessary to meet the other goals of the national park. For example, the Torres Del Paine National Park was suggested for amplification from 25,000 ha to 163,000 ha in order to provide for recreational, educative and scientific objectives as well as to meet regional development goals of international tourism.

The Chilean systems study made specific recommendations for each park: some were suggested to remain as national parks; others were suggested for reassignment to another wildland management category. Several of the major ecological regions of the country were not represented by areas in the list of qualified national parks or other sufficiently protected areas to insure perpetual ecological integrity. Thus, the "open niches" were identified in the draft park system shown in Figure VI-B-5.

Finally, the results of the study were summarized in a matrix shown in Table VI-B-3, which related each park area to recommended comments and suggestions for their management. These latter include its reassignment to another category, its combination with another area to form a larger conservation unit capable of addressing the objectives, or the search for a new park area in a particular region of the country where representation in the system is currently absent.


LAUCA
ARICA
IQUIQUE
ANTOFAGASTA
ATACAMA *
Territorio Antartico Chileno
ANTARTICA
RAPA NUI (ISLA DE PASCUA)
OCEANO PACIFICO
LA SERENA
FRAY JORGE
VALPARAISO
SANTIAGO
LA CAMPANA
STGO. ANDINO *
JUAN FERNANDEZ
TALCA ANDINO *
CONCEPCION
LOS ANGELES
TEMUCO
VALDIVIA
PTO MONTT
PTO AISEN
PTO NATALES
PTA ARENAS
PTO WILLIAMS
PTO NAVARINO
NAHUELBUTA
LOS PARAGUAS/ CONGUILLIO
VILLARRICA
ALERZALES/ BARRA DEL R. BUENO *
PUYEHUE/ V. PEREZ ROSALES *
VELCHO *
REPUBLICA ARGENTINA
LAGUNA SAN RAFAEL *
PAINE O'HIGGINS/ BALMACEDA *
PALI-AIKE/ JOHN FELD *
ALBERTO M. DE AGOSTINI
A. ZONA CON CARACTERISTICAS DESERTICAS
1. Region Desertica Litoral
2. Region Desertica Interior
B. ZONA CON CARACTERISTICAS TROPICALES
3. Region Tropical Marginal
4. Region Tropical de Altura
C. ZONA CON CARACTERISTICAS MEDITERRANEAS
5. Region Mediterranea Per Arida
6. Region Mediterranea Arida
7. Region Mediterranea Semi Arida
8. Region Mediterranea Sub Humeda
9. Region Mediterranea Humeda
10. Region Mediterranea Per Humeda
D. ZONA CON CARACTERISTICAS OCEANICAS
11. Region Oceanica con Influencia Mediterranea
12. Region Oceanica Templada Fria
13. Region Oceanica Sub Antartica
14. Region Oceanica Trasandina
E. ZONA CON CARACTERISTICAS CONTINENTALES
15. Region Andina
Parques Nacionales
Ciudades
* Parques propuestos en Regiones sin representacion o Parques existentes a combinarse.

* Proposed National Parks to cover all Ecological Regions (new areas or redefined existing areas).

Figure VI-B-5. As a result of the systems study in Chile, it was demonstrated that several of the major ecological regions of the country were not represented by areas in the list of qualified national parks or other protected areas. The "open niches" were thus identified. New park sites were proposed, or alternative, existing conservation areas were proposed for redefinition or combination with other existing smaller areas.

Source: Thelen, K. D. and K. R. Miller, 1975.

TABLE VI-B-3

SUMMARY OF THE ANALYSIS AND EVALUATION OF THE EXISTING SYSTEM OF NATIONAL PARKS IN CHILE

RESUMEN DEL ANALISIS Y EVALUACION DEL ACTUAL SISTEMA DE PARQUES NACIONALES

CLAVE PARA LA EVALUACION

1. Excelente
2. Bueno
3. Aceptable
4. Inaceptable
5. Faltan datos
6. No se aplica

Las provincias corresponden a la división territorial anterior al 1º Enero de 1976.

	PARQUES NACIONALES ESTABLECIDOS POR LEY O DECRETO	PROVINCIA	Superficie hectareas	Fecha de establecimiento	Representación de una región ecológica	Representación de una unidad geomorfológica	Calidad estética de paisaje terrestre o marítimo	Significación cultural	Potencialidad para recreación educación	Potencialidad para turismo internacional	Area superficial suficiente para lograr objetivos	Ausencia de alteración humana	Presencia de rasgos naturales sobresalientes	Valores científicos	Factibilidad de manejo	COMENTARIOS Y SUGERENCIAS
1	LAUCA	TARAPACA	400,000	1965	1	1	1	2	3	2	1	3	2	1	3	Reune requisitos y debe mantenerse y manejarse como Parque Natu
2	ISLUGA	TARAPACA	402,000	1967	1	1	2	2	3	4	1	3	3	1	3	Merece un estudio de alternativas de manejo
3	RAPA NUI	VALPO.	[illegible]	1935	3	2	3	1	2	1	1	3	2	1	2	Puede reclasificarse y manejarse como Monumento Cultural o mantenerse como Parque Nacional
4	PICHASCA	COQUIMBO	80	1972	4	3	4	6	3	4	4	4	3	2	3	Debe reclasificarse y manejarse como Monumento Natural
5	FRAY JORGE	COQUIMBO	9,845	1967	2	3	3	6	2	3	3	3	1	1	1	Reune requisitos y se combinan los dos sectores como un solo Parque Nacional Se debe aumentar el área superficial para incluir mayor representación ecológica
6	PUNTA DEL VIENTO	COQUIMBO		1967												
7	TALINAY	COQUIMBO	114	1966	calificado en conjunto con Fray Jorge y Punta del Viento											
8	VALLE DEL ENCANTO	COQUIMBO	120	1972	6	4	4	2	3	3	4	6	6	2	3	Debe reclasificarse y manejarse como Monumento Cultural
9	LOS MINEROS	VALPO.	3	1967	4	4	4	4	4	4	4	4	4	4	3	Debe eliminarse del Sistema Nacional y reclasificarse como sitio histórico al nivel local de gobierno
10	LA CAMPANA	VALPO.	?	1967	2	2	2	6	2	3	1	3	2	2	3	Reune requisitos y debe mantenerse y manejarse como Parque Nacional
11	EL MORADO	SANTIAGO	3,000	1974	4	4	2	6	4	3	4	1	2	3	2	Debe reunirse con el propuesto Parque Nacional Santiago Andino
12	JUAN FERNANDEZ	VALPO	18,300	1935	2	2	2	3	3	2	1	3	1	1	2	Reune requisitos y debe mantenerse y manejarse como Parque Naci
13	LAS PALMAS DE COCALAN	O' HIGGINS	5.000	1972	3	4	3	3	3	4	2	4	2	1	2	Debe reclasificarse como Monumento Natural
14	EL BALLENAR DE LAS NIEVES	O' HIGGINS	?	1972	4	3	3	6	4	4	4	3	4	4	4	Debe reclasificarse y manejarse como Monumento Natural
15	LAGUNA DEL LAJA	BIO-BIO	11,600	1958	4	3	4	6	3	4	4	4	2	4	3	Con una ampliación del área superficial debe reclasificarse y manejarse como Bosque Nacional
16	RALCO	BIO-BIO	?	1972	5	5	5	5	6	5	5	6	5	5	5	Debe estudiarse para verificar la factibilidad de manejarse como Bosque Nacional
17	NAHUELBUTA	MALLECO	5,932	1939	1	2	3	6	2	3	3	1	2	2	2	Reune requisitos y debe mantenerse y manejarse como Parque Naci
18	CONTULMO	MALLECO	82	1941	4	4	3	6	3	4	4	3	4	3	2	Debe reclasificarse y manejarse como área de Protección
19	TOLHUACA	MALLECO	3,500	1935	2	3	3	6	3	3	2	3	2	3	3	Suponiendo que se realice la ampliación ya propuesta, debe reclasificarse y manejarse como una zona de protección y recreación del Bosque Nacional Malleco
20	LOS PARAGUAS	CAUTIN	10,000	1940	2	1	1	6	1	2	1	2	1	2	2	Reune requisitos y deben combinarse estas dos unidades y manejarse como Parque Nacional
21	CONGUILLIO	CAUTIN	[illegible]	1970	Calificado en conjunto con Los Paraguas											
22	CERRO ÑIELOL	CAUTIN	80	1967	4	4	4	2	2	3	4	4	4	3	2	Debe estudiarse por su significado cultural; en caso de no tener este nivel nacional, debe reclasificarse y manejarse como Parque a nivel de gobierno local
23	HUENQUEHUE	CAUTIN	3,900	1967	3	3	2	6	3	3	1	2	4	3	3	Merece un estudio de alternativas de manejo
24	VILLARRICA	CAUTIN	13,760	1940	2	1	2	3	1	2	2	3	1	2	2	Reune requisitos y debe mantenerse y manejarse como Parque Nacio
25	PIRIHUECO	VALDIVIA	?	1971	5	5	5	5	5	5	5	5	5	5	5	Debe combinarse como una zona del Bosque Nacional Valdiviense
26	LOS ALERZALES	VALDIVIA	117,000	1941	3	4	3	6	3	3	3	4	2	2	3	En caso de combinarse estas dos unidades y además lograr una ampliación para incluir los terrenos intermedios, reunirían los criterios y deberán manejarse como Parque Nacional
27	BARRA DEL RIO BUENO	OSORNO	610	1940	4	3	2	6	2	3	5	3	2	3	2	
28	PUYEHUE	OSORNO	117,000	1941	1	2	2	6	1	3	1	2	2	2	2	Deben combinarse estas dos unidades y manejarse como Parque Nacional
29	VICENTE PEREZ ROSALES	LLANQUIHUE	135,175	1950	2	1	1	6	1	1	1	2	1	2	4	
30	LAGO ROSSELOT	AYSEN	12,350	1968	5	5	5	6	5	5	5	6	5	5	5	Merece un estudio de alternativas de manejo
31	LAGO LAS TORRES	AYSEN	15,280	1969	5	5	5	5	5	5	5	5	5	5	5	Merece un estudio de alternativas de manejo
32	ISLA GUAMBLIN	AYSEN	10,625	1967	2	3	3	6	4	4	2	1	4	2	4	Debe reclasificarse y manejarse como Reserva Científica
33	CINCO HERMANAS	AYSEN	227	1970	3	4	4	6	4	4	4	1	3	1	1	Debe reclasificarse y manejarse como Reserva Científica
34	RIO SIMPSON	AYSEN	41,160	1967	3	2	3	6	2	3	2	4	3	3	2	Debe reclasificarse y manejarse como Bosque Nacional
35	PUERTO CHACABUCO	AYSEN	221	1964	4	4	4	5	5	5	4	4	4	4	2	Debe reclasificarse y manejarse como Area de Protección
36	DOS LAGUNAS	AYSEN	[illegible]	1967	4	4	3	6	3	4	4	3	3	2	3	Podría reclasificarse y manejarse como Santuario de la Vida Silvestre
37	QUINTRALCO	AYSEN	10,300	1967	3	4	4	6	4	4	3	2	4	3	4	Podría reclasificarse y manejarse como parte de una reserva de recurs
38	LOS HUEMULES	AYSEN	12,500	1967	3	4	4	6	4	4	3	2	4	3	4	Podría reclasificarse y manejarse como parte de una reserva de recursos
39	BAHIA ERASMO	AYSEN	28,320	1967	2	2	2	6	3	4	2	1	4	2	4	El Parque Laguna San Rafael reune criterios y debe mantenerse y manejarse como Parque Nacional
40	LAGUNA SAN RAFAEL	AYSEN	1,350,123	1967	1	1	1	6	2	3	1	1	1	2	3	Debe considerarse la reclasificación y combinación de las unidades El Guayeneco y Bahía Erasmo con el Parque Laguna San Rafael
41	EL GUAYENECO	AYSEN	30,490	1967	2	3	3	6	4	[illegible]	2	1	4	2	4	
42	BERNARDO O' HIGGINS	MAGALLANES	1,761,000	1970	1	1	2	6	3	3	1	1	2	2	3	Reune los requisitos para mantenerse y manejarse como Parque Nacional. Debe combinarse las tres unidades para formar un gran Parque con representación completa del área y sus recursos
43	TORRES DEL PAINE	MAGALLANES	111,000	1959	2	1	1	6	2	2	1	2	1	2	3	
44	MONTE BALMACEDA	MAGALLANES	7,900	1969	4	2	2	6	2	2	3	2	2	2	2	
45	PALI-AIKE	MAGALLANES	3,000	1970	2	1	2	2	2	2	3	3	2	2	3	Debe combinarse con el propuesto Parque John Fell, pues reuniría los criterios para manejarse como Parque Nacional
46	LOS PINGUINOS	MAGALLANES	97	1966	4	4	4	5	3	4	5	4	2	2	3	Debe reclasificarse y manejarse como Santuario de la Vida Silvestre
47	LAGUNA DE LOS CISNES	MAGALLANES	25	1966	4	4	4	6	3	4	5	4	2	2	3	Debe reclasificarse y manejarse como Santuario de la Vida Silvestre
48	HERNANDO DE MAGALLANES	MAGALLANES	840,000	1970	2	2	3	6	4	3	1	1	3	2	3	Podría reclasificarse y manejarse como una Reserva de Recursos
49	ALBERTO M. DE AGOSTINI	MAGALLANES	800,000	1967	1	1	2	6	3	2	1	1	3	3	3	Reune los requisitos para mantenerse y manejarse como Parque Nacional
50	CABO DE HORNOS	MAGALLANES	63,000	1945	1	3	3	6	4	3	2	1	3	2	1	Debe reclasificarse y manejarse como Monumento Natural

Source: Thelen, K. D. and K. R. Miller, 1975.

The team members designed the summary matrix in Table VI-B-3 to aid coordination with future studies on other wildland categories. Also, the matrix is intended to express to development planners the relative values of each area. Because of time pressures it was impossible to give parallel attention to historical and archeological values. The effort on Rapa Nui (Easter Island) represents the major work on a cultural heritage area. The team did recommend that the long-run objective of the park system was to cover both the natural and cultural heritage of the nation on a integrated basis.

In Ecuador, the Forest Service and the FAO Forestry Project (UNDP/FAO/ECU/71/527) prepared a STRATEGY during 1974 through 1976 for the rational and efficient use of the nation's outstanding wildlands and the adequate employment of the necessary human and financial resources to plan and manage these areas.[28] The preparation of the STRATEGY had evolutionary ties with the work in Costa Rica, Cuba and Chile. The method shown in detail in Table VI-B-4, has four predominant steps:

I. National Inventory
II. Study of Alternatives
III. Elaboration of Preliminary Strategy
IV. Integration of Strategy into the National Planning Process.

Following the design of a conceptual framework and methodology for the study, a seminar was held for all participants (see Figure VI-B-6). The methods to be used,[29] as well as the criteria, norms and concepts from other parallel efforts[30] were presented. Several workshop-type exercises were given during the seminar to illustrate the methods and to stimulate discussion and the exchange of ideas among the foresters, agronomists and biologists who were to carry out much of the field work. Subsequently, these officers shared the instructions, materials and experience with their subordinates in their respective regional and district offices.

The field personnel implemented the NATIONAL INVENTORY stage and nominated a total of 90 sites from their districts to be considered as potential wildland conservation units.

The headquarters team of four Ecuadorian and FAO professionals worked as two field teams to implement the STUDY OF ALTERNATIVE USES stage. One team visited all of the nominated areas lying along the coast and in the Andes. The second team covered the Amazonian sector of the country. Each of the 90 nominated areas were visited and qualified, the pertinent data being recorded on field inventory sheets as shown in Table VI-B-5.

In Table VI-B-6, thirteen PRIMARY CONSERVATION OBJECTIVES for the management of wildlands are listed. Four MANAGEMENT SYSTEMS were designed to yield all of the objectives in four different, technically compatible combinations. These four categories were chosen as appropriate for the scope of the National Park and Wildlife Department of the Ecuadorian Forest Service. It was explicitly assumed that the other categories such as National Forest, Protected Zone, Scenic

TABLE VI-B-4

METHOD FOR THE NATIONAL SYSTEMS STUDY EMPLOYED IN ECUADOR

Actividades Realizadas en las Cuatro Fases

I	II	III	IV
Inventario Nacional	Estudios de Alternativas	Elaboración de la Estrategia Preliminar	Integrar a la Planificación
1. Escoger criterios y normas. 2. Recopilar datos básicos, estudios y recomendaciones anteriores realizadas por el Servicio Forestal y otros organismos. 3. Consultar con individuos y organismos involucrados en la conservación, educación y recreación	1. División del grupo de trabajo (4 personas) en dos equipos de reconocimiento; uno para la costa y sierra y otro para el oriente. 2. Reconocimiento de todas las áreas inventariadas. 3. Escoger en forma preliminar el sistema más adecuado para cada área pequeña o sencilla. 4. Estudios detallados de las alternativas de manejo de las áreas grandes o complejas.	1. Determinar el valor intrínseco de cada área considerando sus recursos naturales, su potencial de uso y factores administrativos en función a los objetivos de manejo. 2. Considerar la representación equilibrada de los fenómenos naturales. 3. Buscar áreas no representadas e incluir en el sistema. 4. Determinar prioridades de manejo del Departamento en base a los valores intrínsecos de cada área y la representación equilibrada de los fenómenos naturales. 5. Elaborar un borrador de la estrategia preliminar	1. Presentar la estrategia preliminar a personas y organizaciones interesadas solicitando sugerencias para su mejoramiento 2. Modificar la estrategia según los comentarios recibidos. 3. Actualizar política y legislación orgánica que facilite la implementación de la estrategia. 4. Presentar la estrategia preliminar a la Junta Nacional de Planificación y organismos de desarrollo regional. 5. Fomentar la creación de la Comisión Nacional de Areas Naturales y Culturales sobresalientes. 6. Fomentar el estudio de otras categorías de áreas no incluídas en la estrategia preliminar.

Source: Putney, A. D., 1976. p.11.

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Figure VI-B-6. In Ecuador, a workshop was held for the senior staff of the Forest Service to study the methods to be employed in the systems plan for the nation. Each participant subsequently worked as part of the team to review natural areas throughout their respective districts.

TABLE VI-B-5

FIELD INVENTORY SHEET UTILIZED TO RECORD INFORMATION ON THE OUTSTANDING NATURAL AREAS OF ECUADOR

Datos Básicos

Nombre del Area: ______

Localización: ______

Número de Referencia: ______ Superficie Aproximada ______

Análisis del Recurso

Regiones Naturales: ______

Ecosistemas Terrestres: ______

Ecosistemas Acuáticos: ______

Formaciones Terrestres: ______

Historia Geológica: ______

Bellezas Escénicas: ______

Fenómenos Unicos: ______

Potencial de Uso

Servicios: ______

Productos: ______

Manejo Propuesto: ______

Factores Administrativos

Facilidad de proteger, manejar y administrar: ______

Ocupación existente o potencial: ______

Urgencia de protección: ______

Tenencia de la tierra: ______

Uso actual: ______

Usos o proyectos alternativos: ______

Infraestructura actual : ______

Posible cooperación inter-institucional: ______

Meidas más Urgentes: ______

Referencias: ______

Sc[illegible]: [illegible]ney, D. [illegible]'76. [illegible] 56.

TABLE VI-B-6

MANAGEMENT SYSTEMS TO BE ADMINISTERED BY THE DEPARTMENT OF NATIONAL PARKS AND WILDLIFE IN ECUADOR, SHOWING THE RESPECTIVE MANAGEMENT OBJECTIVES

OBJETIVOS PRIMARIOS DE CONSERVACION	SISTEMAS DE MANEJO			
	PARQUE NACIONAL	RESERVA ECOLOGICA	RESERVA DE PRODUCCION FAUNISTICA	AREA NACIONAL DE RECREACION
Conservar muestras de ecosistemas en estado natural.	X	X	Y	Y
Conservar diversidad ecológica, regulación del medio	X	X	Z	Z
Conservar recursos genéticos	X	X	Z	Z
Dar educación, investigación y estudio sobre el medio	X	X	Y	X
Conservar la producción hídrica	Z	Z	Z	Z
Control erosión, sedimentación y proteger obras río abajo	Z	Z	Z	Z
Producir proteína de fauna; caza y pesca deportiva			X	
Suministrar servicios recreativos y turismo	X	Y	Y	X
Producir madera y forraje con rendimiento sostenido				
Proteger sitios y objetos de herencia cultural, histórica y arqueol.	X	Y		Y
Proteger y fomentar bellezas escénicas y áreas verdes	X	Z	Z	X
Mantener opciones abiertas; flexibilidad de manejo		X		
Fomentar el uso racional de áreas marginales y desarrollo rural integral	Z	Z	X	X

X Objetivo primario para el manejo del área y los recursos

Y No necesariamente primario, pero siempre incluído como un objetivo importante

Z Incluído como objetivo donde los recursos y otros objetivos de manejo lo permiten.

Source: Putney, A. D., 1976, p. 7.

Easement and Right-of-way, Cultural Monument, and Watershed Program would be managed by other existing public departments and institutions.[31]

All 90 nominated areas were divided among the four alternative management categories as shown in the two left-hand columns of Table VI-B-7. This decision was based upon somewhat subjective judgements concerning the alternative ways in which each area could in fact be managed as revealed by the results of an analysis of each area's resources and the particular socio-economic contexts.

Each area was then judged for its NATIONAL SIGNIFICANCE: "to possess values or exceptional qualities of significance for the entire Ecuadorian people."[32] They contain features, formations and unique examples of natural features, scenic qualities, etc. While no satisfactory means for distinguishing "national significance" are available in absolute terms, guidelines for a relative evaluation were used:[33]

1. Formations or exceptional geological features which show in a significant manner the geological processes.
   Example -- the active volcanos of Sangay and Reventador.

2. Unique geological formation or features.
   Example -- the sand dunes of Palmira.

3. Important samples of the development of life on Earth.
   Example -- the petrified trees of Puyango.

4. An ecosystem or complex of ecosystems which demonstrates in a significant manner the characteristics of a life zone, a biotic province or natural region.
   Example -- the area between the Cotacachi Volcano and the Cayapas River which contains the greatest number of (unaltered) life zones in any single area of the country.

5. A significant ecosystem which demonstrates the processes of succession.
   Example -- the invasion of a natural manner of plants, their establishment and development on recent volcanic deposits of the Sangay Volcano.

6. Habitats with unique species, rare or endangered species.
   Example -- the endemic species of the Galapagos Islands.

7. A relict flora or fauna of past epochs.
   Example -- the giant Galapagos of the Galapagos Islands.

8. A habitat which lends itself to large seasonal concentrations.
   Example -- the bird migrations and the Sade Lagoon.

TABLE VI-B-7

METHOD FOR RECORDING THE INTRINSIC VALUES OF THE OUTSTANDING NATURAL AREAS OF ECUADOR

Categoría de manejo	Area propuesta	Importancia del recurso.	Uso potencial	Factores administrativos	Puntaje Total	Prioridad
Parque Nacional	GALAPAGOS	77	50	+40	167	1
	SANGAY	88	48	+25	161	2
	CAYAMBE-COCA	80	48	+25	153	3
	COTOPAXI	69	50	+15	134	4
	PICHINCHA	56	50	+20	126	5
	YASUNI	60	46	+20	126	6
	PUERTO LOPEZ	47	44	0	91	7
RESERVA ECOLOGICA	Conambo Pindo	48	38	+20	106	1
	Cayapas Cotachi	62	38	0	100	2
	Lagarto Cocha	50	42	+ 5	97	3
	Chongón Colonche	32	38	+20	90	4
	Limón Cocha	33	30	+20	83	5
	Sumaco	41	30	+10	81	6
	Bosq. de Chinchona	19	20	+ 40	79	7
	Bosq. de Podocarpus	20	26	+ 30	76	8
	Arch. de Jambelí	31	30	+ 15	76	9
	Padmi	15	24	+ 30	69	10
	Cazaderos	28	30	+ 10	68	11
	Arenillas	9	20	+ 35	64	12
	Cord. de Chilla	22	30	+ 10	62	13
	Manglar	16	26	+ 20	62	14
	Tahuín	16	24	+ 15	55	15
	Ilinizas	48	36	- 30	54	16
	Sade	25	18	+ 5	48	17
	Isla la Plata	21	20	- 5	36	18
	Palmira	19	16	0	35	19
	El Angel	17	22	- 10	29	20
	Zucarqui	14	20	- 5	29	21
	Aves M. de Limones	15	14	- 5	24	22
	Isla Sta. Clara	17	12	- 5	24	23
	Puyango	11	22	- 10	23	24
	Paquishapa	13	20	- 10	23	25
	G. de Pastaza	22	14	- 15	21	26
	Tundo y Jujal	8	16	- 5	19	27
	Bosque de [illegible]	9	20	- 20	9	28
	Gualguama	7	14	-20	1	29
	B. de Palma de Cera	9	12	- 40	-19	30
Area Nacional de recreación	Pichincha	19	26	+ 15	60	1
	Lag. de Mojanda	31	16	+ 10	57	2
	Lag. de Cajas	21	16	0	37	3
	Cerro Azul	9	22	0	31	4
Reserva Faunística	Cuyabeno	41	40	+25	106	1
	Cord. de Cutucú	42	32	0	74	2
	Antisana	51	30	- 20	60	3
	Río Tigueno	23	22	+15	60	4
	Shushufinci	23	22	+ 10	55	5
	Río Eno	23	22	+10	55	6
	Río Hoja Blanca	24	26	0	50	7

Source: Putney, A. D., 1976. p. [illegible].

9. An area of great scenic beauty which serves as a sample of the natural heritage of the country.
Example -- the landscapes along the coast near Puerto Lopez.

The ELABORATION OF THE PRELIMINARY STRATEGY, stage III, consisted of an evaluation of each site according to the IMPORTANCE OF THE RESOURCES, the POTENTIAL USE, and the ADMINISTRATIVE FACTORS which would affect the management of each area. The following variables were considered:

- Importance of the Resource
  - Natural Regions
  - Terrestrial Ecosystems
  - Physiographic Formations
  - Geological History
  - Scenic Beauty, and
  - Unique Characteristics.

- Potential Use
  - Service, including
    - Protection of Features
    - Conservation of Ecosystems
    - Recreation
    - Tourism
    - Education, and
    - Investigation;
  - Products, including
    - Wood
    - Forage
    - Wildlife, and
    - Water

- Administrative Factors
  - Urgency of Protection
  - Ease of Administration
  - Legal Factors
  - Institutional Cooperation with other Agencies

The values were added for each area within the three factor groups as reflected in columns 3, 4, and 5 of Table VI-B-7. The totals were presented in the sixth column. And to make the table more instructive, the areas were listed in descending order of value within the MANAGEMENT CATEGORY classes. In the seventh vertical column of the Table, numerical priorities were assigned which ranked the areas in direct relation to the total values obtained by the afore-discussed analysis.

This procedure attempted to assign a numerical value to each area within management category classes. Then, additional criteria were utilized to adjust these values to insure that the park system (a) represented, in a balanced manner, the natural resources of the country, and (b) included a variety of management categories in order to produce the optimum combination of uses of these resources. To cross-check the numerical values of Table VI-B-7, and to guide the necessary adjustments, four specific criteria were suggested by the Department of Parks and Wildlife. The park system should include adequate:

1. representation of each of the biotic provinces of the country using the IUCN schematic as the basis[34] --

    Galapagos Islands
    Colombian Coastal
    Colombian Dry Forest
    Northern Andean
    Andean Cloud Forest
    Amazonian;

2. representation of the major marine and coastal environments using the Ray schematic as the basis[35] --

    Exposed Environments
    Protected Environments
    Deltas
    Mangroves;

3. inclusion of wildlands which provide recreation and educational services to the major centers of population of the country, that is, the urban areas of Guayaquil, Quito and Cuenca; and

4. representation of all of the management categories which were selected by the Department to achieve their objectives, including National Park, Ecological Reserve, Fauna Production Reserve and National Recreation Area.

By applying these criteria, two general levels of priority areas were distinguished. The first level includes a reduced number of areas and was called the "minimum system of outstanding wildlands." Table VI-B-8 illustrates this MINIMUM SYSTEM relating each site to the criteria.

The second level (which will not be discussed further) includes those areas which received the highest numerical values but did not rate high by the final four criteria. The areas with lowest qualifications were discarded, leaving a total of 9 areas for the minimum list, and an additional 29 for the second, or "expanded system" of outstanding wildlands.

In Brazil, the Brazilian Institute for Forestry Development (IBDF) and the national FAO Project (UNDP/FAO/BRA/71/545) with support from the Brazilian Foundation for Nature Conservation (FBCN) initiated work on planning a system of antional parks in 1975 in response to two important mandates:

a) The Second National Development Plan[36] (IIPND 1975-1979) includes national objectives for "... achieving development without deterioration in the quality of life, and, in particular, without devastating the country's patrimony of natural resources." The National Development Plan notes that "Brazil must defend its patrimony of natural

TABLE VI-B-8

THE MINIMUM SET OF WILDLANDS RECOMMENDED FOR THE SYSTEM OF CONSERVATION AREAS IN ECUADOR

○ Caracteristicas adicionales ▨ Motivos principales	PROVINCIAS BIOTICAS						SERVICIO PARA GRANDES URBES			AMBIENTES MARINOS				SISTEMAS DE MANEJO			
Areas Seleccionadas	GALAPAGOS	COSTA COLOMBIANA	BOSQUE SECO	ANDES DEL NORTE	BOSQUE NUBOSO ANDINO	AMAZONAS	GUAYAQUIL	QUITO	CUENCA	AMBIENTE EXPUESTO	AMBIENTE PROTEGIDO	DELTA	MANGLARES	PARQUE NACIONAL	RESERVA ECOLOGICA	RESERVA DE PRODUCCION FAUNISTICA	AREA NACIONAL DE RECREACION
GALAPAGOS	▨									▨	▨		○	▨			
SANGAY				▨	▨									○			
PUERTO LOPEZ			▨				▨			○	○			○			
COTACACHI - CAYAPAS		▨		○	○										▨		
RIO YASUNI						▨								○			
COTOPAXI				○	○			▨						○			
CUYABENO						○										▨	
MANGLAR			○				○					▨	▨		○		
LAS CAJAS				○					▨								▨

Source: Putney, A. D., 1976. p. 26.

resources systematically and pragmatically. Its preservation is part of development...

The National Development Plan calls for an "... early designation of national parks, national forests, biological reserves..." in the Amazon as part of the government's development policy.

b) Article 5 of the POLAMAZONIA decree[37] states that integrated development plans for each priority development pole should consider "... the designation of lands for forest and biological reserves, national parks and indigenous reserves."

The IBDF/FAO team addressed these two mandates simultaneously. A first report to the Government of Brazil was presented in 1976 in which the conservation problems of the entire nation were addressed and a basic framework was given for a major effort to examine the Amazon Basin as a single unit.[38] A second document was then prepared which focused specifically upon the Amazon/Orinoco region including portions of Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Surinam and Venezuela.[39] It also included a considerable amount of new biological information in various phases of publication at that time by diverse scientists which was not available when the original report was prepared.

Six objectives guided the work on this complex and little known region:

1. To synthesize the published works of various Amazon specialists into a common format from which biologically significant nature conservation priorities can be tentatively identified.
2. To identify and locate the existing and planned nature conservation units in the Amazon.
3. To analyze the potential compatabilities or incompatabilities between the Brazilian POLAMAZONIA priority development poles and the preservation of biologically significant areas.
4. To propose a general outline of an Amazon nature conservation program which gives due consideration to the diversity of that region, permits identification of key areas to be preserved, yet is flexible enough to adapt to future scientific discoveries.
5. To permit those public agencies responsible for national parks and equivalent reserves to gain an offensive position from which an Amazon conservation policy can be actively pursued, prior to the elimination of this option by other developments.
6. To contribute, in the particular case of Brazil, towards the development of a National Park System Plan.

Existing and planned conservation units in the Amazon were analyzed in terms of the objectives being sought and their coverage of phytogeographic regions.[40] While conservation units existed in some phytogeographic regions under one type of wildland management or another, several regions had no parks or reserves. The analysis showed where gaps were obvious, and it also demonstrated the need for more detailed classification to insure adequate conservation of the diversity of the region.

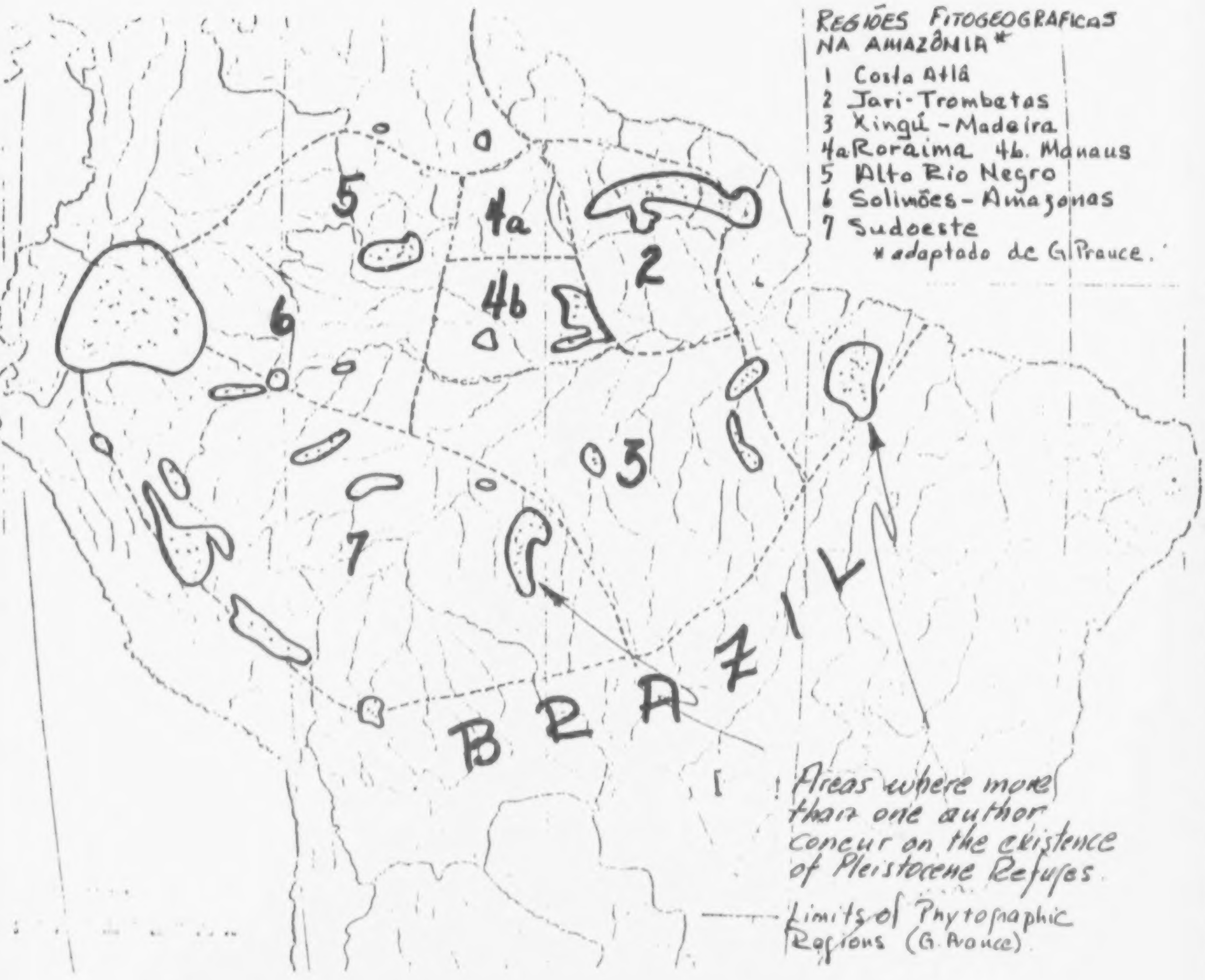
Considerable effort went into refining vegetation maps to locate areas of biological diversity. Particular attention was given to the areas called "Pleistocene Refuges."[41] These are areas which are believed by an increasing number of scientists to have functioned as flora and fauna refuges during the alternative periods of wet and dry in the Pleistocene. During these long phases of alternative wet and dry, it is probable that considerable endemism occurred. These islands of plants and animals which were genetically isolated for long geological periods subsequently functioned as repopulation centers for the entire region. Alternate waves of birds, reptiles, mammals, amphibians, fish, and lower and higher orders to plants crept out from these centers in the wet periods, and retreated in the dry. Each wave was different, carrying new genetic messages to the vast surrounding area.

Information on birds, lizards, butterflies and various plants was synthesized. Known details of vegetation formation, and the theoretical Pleistocene refuges based on bird speciation patterns, botanical evidence and butterflies were mapped. By overlayering this information, the team determined where two or more Pleistocene refuges overlapped as shown in Figure VI-B-7. This procedure can be criticized since the data are theoretical and at an incredibly large scale. As the authors indicated, the extent to which the natural environment had already been altered by the Trans-Amazonian Highway, colonization, and other development activities was not considered in the analysis but rather left for subsequent cross-checking in the field.

However, what is relevant is that the government has mandated the design and establishment of a network of parks and reserves. The opportunity to "get there first" has been given to those concerned with conservation. The ball is in the court of the forestry, park and wildlife scientists and managers. They need to develop indicators and tools quickly to view, with some rationality, a vast region which to most observers is a giant sea of homogenous green jungle.

Thus, as a first dimension, the areas located in places of considerable biological importance should be given serious consideration in designing a park and reserve system.

A second dimension of the Brazilian systems study focuses on the other side of the coin. Development poles are being instrumented across the Amazon region of Brazil under the POLAMAZONIA program. In those pole areas there is a high probability of losing biologically important sites. However, again, the decree puts the ball in the wildland planners' court by instructing those making the integrated development



Areas where more than one author concur on the existence of Pleistocene Refuges

----- Limits of Phytographic Regions (G. Prance)

Figure VI-B-7. The phytogeographic regions of the Amazon, showing the areas where more than one scientist/author concur on the existence of pleistocene refuges.

Source: Wetterberg, G. B. *et al* 1976. Nº8, pp. 49 and 56.

plans for each pole to consider "... the designation of land for forest and biological reserves, national parks, and indigenous reserves."

The development poles shown in Figure VI-B-8 were studied in relation to the areas of high biological importance. Only three development poles overlap with the previously identified areas of Figure VI-B-7.

The team then looked for priorities to guide their work. Several criteria were designated:[42]

1. Preserve at least an average of three major samples of each phytogeographic region.

2. These samples should be approximately 500,000 ha in extent each, to include a core area of approximately 250,000 ha and a 10 km wide buffer strip.

3. According to local circumstances, as many as 24 smaller preserves of approximately 100,000 ha each might also be created for "... rare or uncommon sites such as bird or turtle nesting areas, areas of local species concentrations or other outstanding natural phenomena such as waterfalls and dunes.

FIRST PRIORITY areas were defined as those which two or more authors have identified as likely Pleistocene refuges. While these sites may not represent the places of greatest plant and animal diversity at the present time, they probably were the centers of evolutionary dispersion. Consideration was given to sites between the refuges where inter-breeding must have occurred among organisms from two or more refuges.

SECOND PRIORITY is assigned to areas which contain samples of several vegetative formations and perhaps also a refuge.

THIRD PRIORITY areas include all other parks and reserves proposed by other institutions and which do not fall into the first two categories.

Figure VI-B-9 shows the first and second priority areas identified by the study.

In early 1977, this second document was publically distributed to authorities in each Amazonian country as well as national planning bodies, universities, research institutes and individual scientists both in Brazil and abroad, requesting its critical evaluation. The results of this critical review, as well as a summary of progress made towards implementation of the document's recommendations were presented formally at the Second Meeting of the "Intergovernmental Technical Committee for the Protection and Management of Amazonian Flora and Fauna."[43] At that meeting it was agreed that the countries represented would give special consideration to the priority areas identified in the document which were located within their national jurisdiction.

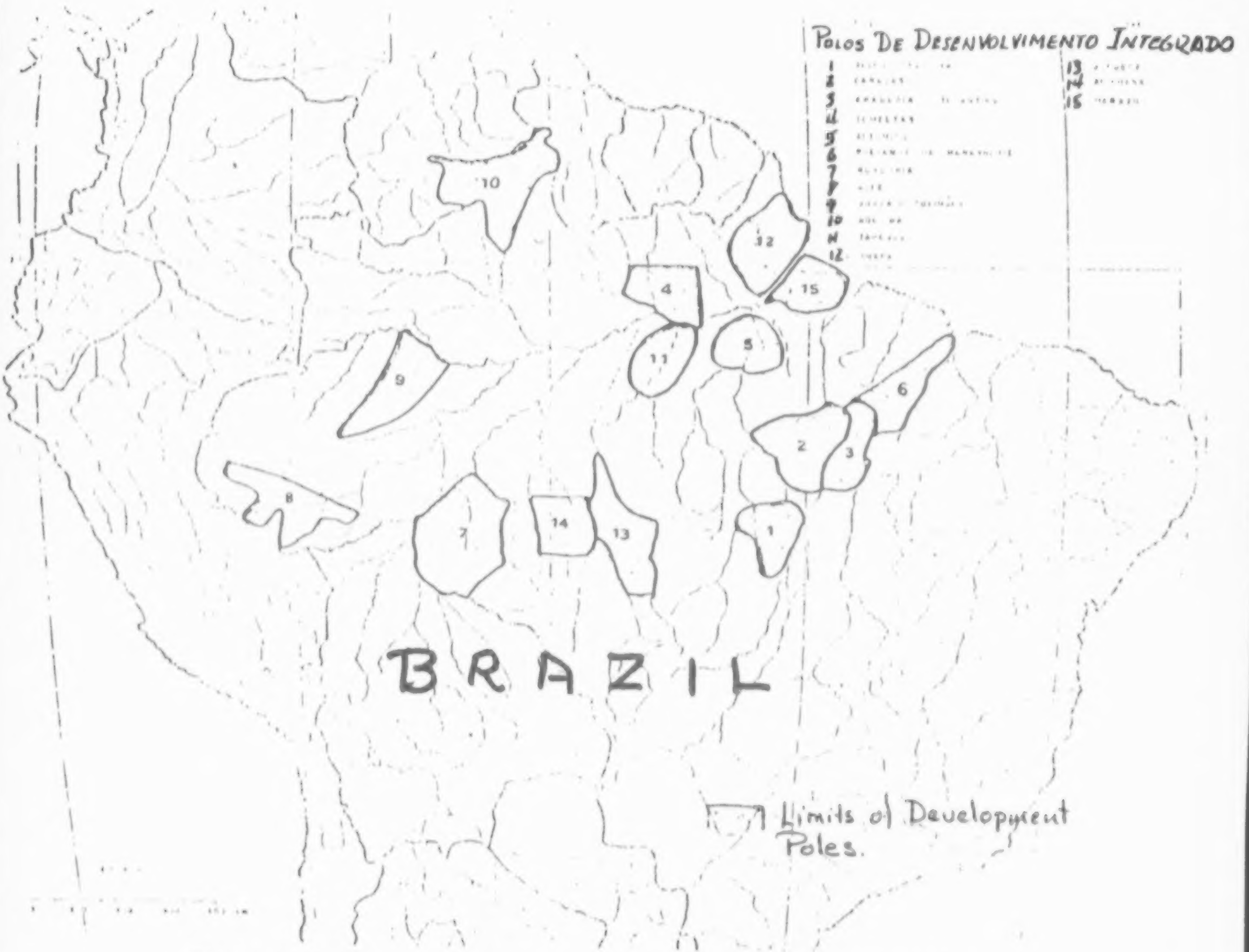

Polos De Desenvolvimento Integrado
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
BRAZIL
Limits of Development Poles.

Figure VI-B-8. Priority "development poles" have been identified by the Brazilian Government for the Amazon region.

Source: Wetterberg, G. B. et al, 1976. [illegible] pp. 57.

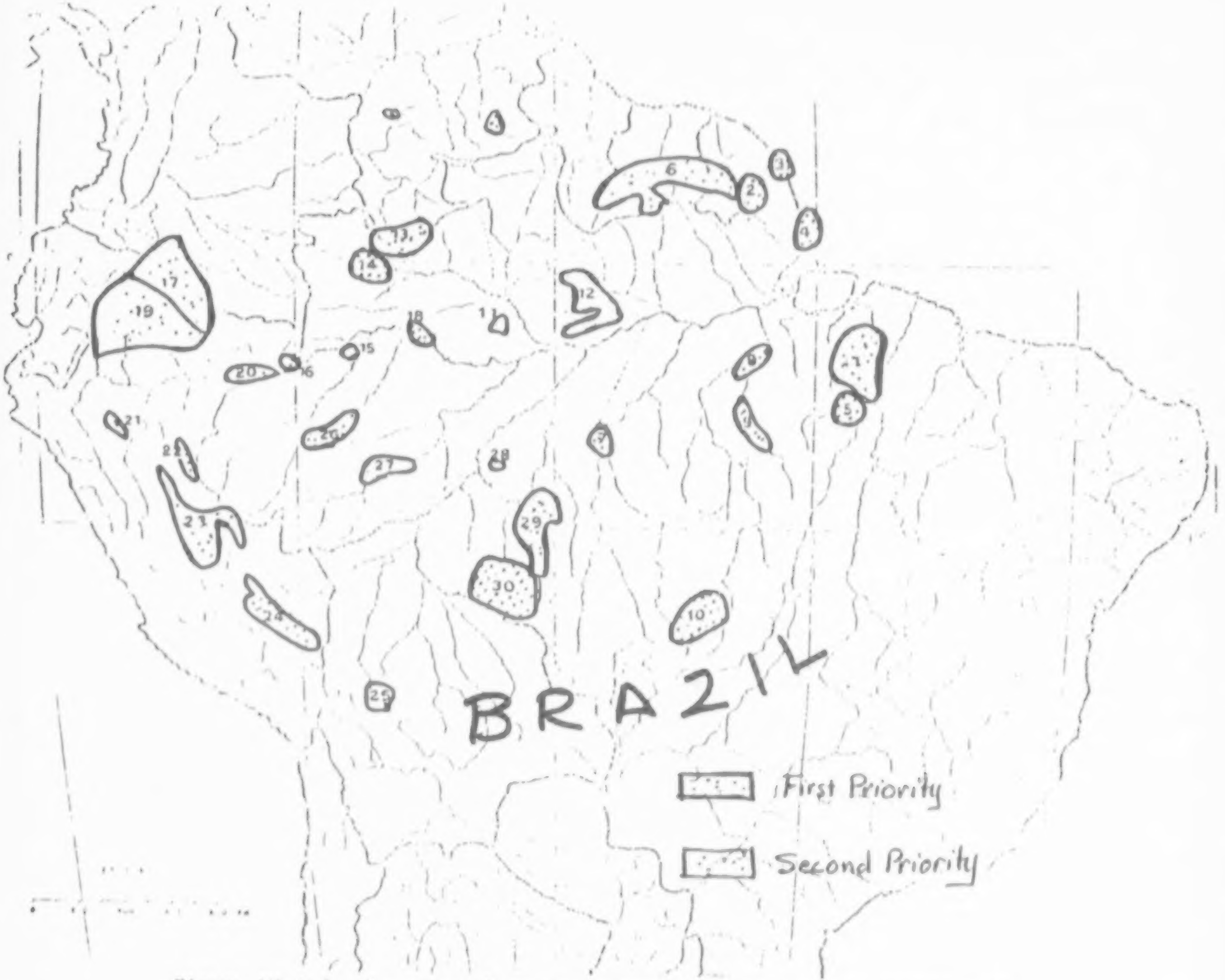


Figure VI-B-9. The general areas recommended for habitat preservation in the Amazon, showing those considered to be of "first" and "second" priority.

Source: Wetterberg, G. B. et al. 1976. Nº8. p. 58.

*Note: Page 445 was omitted from the original document given to Peace Corps.

This method for designing a park and reserve system for the Amazon is a beginning step. It requires continuous research and updating. It serves to identify (a) areas of high biological interest and (2) areas of high potential conflict with alternative forms of development. Obviously, there are many other important areas for conservation to meet the strategies elaborated in Chapter III. However, sufficient information is not yet available to identify more than a small number of these. The method has focused attention upon 30 areas. This is not to say that one or more parks and reserves should be established in each, but they are good places to start.

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CHAPTER VII

THE FORMULATION OF A STRATEGY PLAN

Introduction

The plan for a system of national parks makes clear the amount of work which lies ahead. It is bewildering to consider managing and developing five, ten or more parks. The job involves a decade or longer.

In an effort to cut the job down to human scale, the park director must realize that he can only do so much work each year. According to his budget and personnel, there is a limit to what can be accomplished. Experience and common sense will already have shown him that each task which is taken on is at the expense of another task which may have to be left undone.

The central problem of the planning team is to provide the director with some guidelines for deciding which tasks he should do among the many alternative combinations which he could consider doing. What things come first, which second, third, etc.? Stated differently, how can the director best propose, justify and utilize his personnel and budget to accomplish the goals of the park department? Naturally, there will always be cases when urgent action will have to be taken to establish, protect or implement a park. However, even these opportunities carry costs since other tasks will be left undone in the meantime. The director should at least be aware of these costs to other elements of the park system.

This chapter presents some of the concepts and principles involved. An example of guiding a director and other policy-level officers through the formulation of a strategy plan is given from the case of Chile. A method is suggested to aid all park directors in formulating a simple, straight-forward strategy plan for their park departments.

Similar to the other facets of planning individual and systems of national parks, strategy planning requires a free flow of information, open debate and continuous feedback. The strategy plan can focus the attention of the planning team and the director on those factors within and external to the organization which will support or challenge the department's attainment of its goals on conservation. If wisely employed, the strategy can place the department on the offensive and help maintain it in a position to contribute to ecodevelopment.

The Basic Concepts and Principles

Before formulating strategy plans there are several concepts and principles which need to be examined. These are vital for an understanding of strategic thinking.

MANAGEMENT ACTIVITIES are specific types of action which are necessary if the primary objectives of conservation are to be accomplished. By using the method for planning national parks of Chapter V, decisions were made concerning the things which needed to be done. Some management decisions called for more detailed planning, others for the implementation of action programs. While some decisions related to the construction of physical facilities, others related to institutional, legal and training activities.

Each park department has a CAPACITY FOR MANAGEMENT. According to the department's budget, personnel and other resource (inputs) there is a LIMIT to the kinds and amounts of management activities which can be accomplished. So, it is one thing to decide what ideally should be done by the department, it is another thing to decide what in fact can be done.

By analogy, no matter how far the driver of a vehicle wishes to travel without stopping, it will be the weakest ingredient (or that ingredient in shortest supply) which will determine how far he actually drives. Will it be the amount of gasoline? Oil? Tires? Transmission? Or, will the driver himself grow weary and choose to stop for rest?

It is certain that one or more factors will force the driver to stop eventually. The wise driver will plan ahead. Some factors can be calculated. For example, his vehicle may be characterized by a consumption of 6 km/liter of gasoline, 5,000 km/liter of oil, 20,000 km during the useful life of a set of tires and 15,000 km between oil changes and lubrication. Past experience may show that the driver can concentrate safely on driving for about 3 hours before needing a rest stop. The mechanical parts of the vehicle will fail irregularly and potentially can intervene to stop the progress of the strip at any moment.

From these calculations it can be seen that either gasoline or driver weariness will force a stop about every three hours. If the driver plans well, he can anticipate the needs for adding oil, changing oil, lubrication or mounting new tires during the same stops as required for gasoline, rest and perhaps a meal. These are always odds that occasionally he will face a mechanical failure between stops. He cannot plan for all eventualities, but through regular mechanical checkups he can keep the surprises down to a minimum. Nevertheless, some risk remains.

The driver can lower the risk by using a high quality vehicle, by giving the vehicle complete periodic maintenance, and by learning to plan his trips carefully. But can he do all these at one time? According to his budgetary situation he may be able to possess an average quality vehicle and to give it only occasional maintenance.

Because he cannot afford to employ a full-time maintenance specialist, he may consider learning and practicing mechanics and maintenance himself. But, if he does that, he will be unable to do something else with his time.

When choosing the best course of action to follow, there are always TRADE-OFFS caused by the short supply of budget, manpower and other inputs related to the amount of work to be done. that is, because of LIMITS TO MANAGEMENT CAPACITY the decision-maker is obliged to trade-off one activity for another to find that kind and amount of work which can be accomplished under the circumstances.

On a plan for an individual park, all activities cannot be done at once (during one financial year). Some trade-offs must be made. Some items can be done this year, others will have to be left until successive years. This type of trade-off was examined under the DEVELOPMENT SCHEDULE in Chapters III and V. Generally, technical reasons can be given to guide this type of decision. However, when facing the trade-offs among the activities of the several parks of a park system, the decisions become more complicated.

Each management activity is evaluated in order to determine its PRIORITY rating. those items to be implemented first within the earliest financial year will be given highest priority. Those times which are left for later periods are given lower priority ratings. Items of lower priority are traded off for those of higher priority.

There are three main criteria to be considered when assigning priorities to a list of management activities for a park system:

a) the activities for the management and development of national parks must be presented in an order determined by technical considerations in the particular country;

b) the activities are rated among all the parks as to the relative urgency for each to be implemented; and

c) while several parks will require urgent attention for each particular kind of activity, the limits on management capacity to implement those kinds of activities force the planners to assign priority ratings to only those which can be done in reality.

For example, logically a conceptual plan should be made for each park on the system prior to implementation of physical, personnel and institutional development. Some parks will require planning urgently because of threats to the natural environment from other uses of the land. The budget, kinds and levels of personnel and vehicles, restrict the capacity of the department to form teams to plan parks. If only one park planning mission can be managed per year given current limitations and given that other on-going activities cannot be abandoned, then which park of those which urgently need a conceptual plan should be planned first? That park will get "top priority." And, there are trade-offs between the major kinds of activities. For example, the cost of developing one park may be equivalent to the cost of providing basic control and protection to 20 parks. Which is more important?

One final concept has to be considered before looking at a specific case from real experience. The factors which relate the amount of urgency carried by a park for a particular kind of management activity are constantly changing. For example, the pressure on wildland for spontaneous, unorganized colonization is very dynamic. It may increase in one area and decrease in another. For example, government programs to organize agricultural reform, develop agriculture colonies, or promote timber or cattle production, can all affect the pressure on wildland.

To the extent that the park department is aware of factors which affect the urgency for implementing park management activities, it will be able to anticipate priorities. Such awareness can provide the necessary feedback for guiding management decisions on priorities for action. Further detail will be discussed below.

An Example from Chile

As a final stage of the Chilean Systems Planning effort of the National Forestry Corporation (CONAF) and the FAO Regional Project on Wildland Management[1] already presented in Chapter VI, a "Strategy for the development of the National Parks of Chile" was formulated.

The parks selected for management and development within the national park system were shown in Table VI-7. Among the 50 existing parks are 19 which were chosen for inclusion in the park system based upon an evaluation of their qualities. Others of the original 50 were combined and altered to form acceptable parks. And, several new areas were suggested to be sought to fill the so-called "open niches."

Fifteen general kinds of management activities were considered under the headings of Planning, Implementation Programs, and Administration. The activities, as shown in Table VII-1, were ordered to reflect the technical logic in park management and development for the case of Chile. This order of activities for park management and development was supported by the published policy of CONAF on National Parks.[2] Naturally, it was recognized that some parks were already partially implemented or under administration when the strategy was prepared. The task of the strategy was simply to decide what is to be done next, regardless of the starting point for each park.

The limits to managerial capacity were analyzed, but due to the extremely dynamic economy during the study, the analysis remained informal and flexible. Salaries and costs of supplies and materials were changed almost daily.

The information was placed on a matrix as shown in Table VII-2. Note that the management activities are presented across the horizontal axis showing an obligatory order from left to right. This list, extending from "new area plans" to "training of personnel," states that

TABLE VII-1

MANAGEMENT ACTIVITIES LISTED IN THE ORDER UTILIZED IN THE CHILEAN STRATEGY PLAN

PLANNING

- New Area Plans
- Management Plans (or Replanning of Management Plans)
- Plans for Management Programs
- Site Plans
- Construction Plans

IMPLEMENTATION PROGRAMS

- Protection of Natural and Cultural Resources
- Visitor Services
- Research
- Physical Infrastructure

ADMINISTRATION

- Dominion and Control of the Park Area
- Regulation and their Application
- Interinstitutional Coordination in Region and ARea
- Public Relations
- Park Personnel
- Training of Park Personnel

Source: Thelen and Miller, 1975.

TABLE VII-2

STRATEGY FOR THE DEVELOPMENT OF THE NATIONAL PARKS OF CHILE

ESTRATEGIA PARA EL DESARROLLO DE LOS PARQUES NACIONALES DE CHILE

ACTIVIDADES DE MANEJO

	PARQUE NACIONAL	PLANIFICACION					PROGRAMAS DE IMPLEMENTACION				ADMINISTRACION					
		Planes en nuevas áreas	Planes de manejo o reformulación	Planes detallados por programas	Planes de sitios	Planos de construcción	Protección del recurso	Servicios a visitantes	Investigación	Infraestructura física	Dominio y control	Reglamentación y aplicación legal	Coordinación interinstitucional	Relaciones públicas	Personal	Capacitación
1	LAUCA	X	5	3/D	3	3	2/D	3	2/D	2/A	1/A	2/B	1/A	2/A	3	2/C
2	ATACAMA	2/C	3	4	5	5	X	X	2/B	X	X	X	2	2	X	X
3	FRAY JORGE	X	5	3/E	2/D	2/C	3	2/C	2/C	3	4	4	4	4	2/B	2/B
4	RAPA NUI	X	5	3	2/C	3/E	2/C	2/B	3	3	3	3	2/C	2/C	2/E	2
5	JUAN FERNANDEZ	X	5	2/A	2/B	3/D	1/A	3	1/A	2/B	1/B	2/A	2/B	2/D	2/C	2/A
6	LA CAMPANA	X	2/A	4	4	5	2/D	2/A	4	2/D	2/C	2/D	3	3	2/A	3
7	STGO. ANDINO	2/B	2	4	4	4	X	X	3	X	X	X	2/D	3	X	X
8	TALCA ANDINO	3/E	4	4	4		X	X	3	X	X	X	3	3	X	X
9	NAHUELBUTA	X	2/B	3	3	3	3	2/E	3	3	5	4	4	3	3	3
10	LOS PARAGUAS CONGUILLIO	X	5	3	2/A	2/A	3	2/D	3	3	4	3	4	3	3	2
11	VILLARRICA	X	5	3	2	3	3	3	3	2	3	3	3	3	2	3
12	LOS ALERZALES BARRA DEL RIO BUENO	1/A	3	3	3	3	3	3	3	3	2	2	3	2/D	3	X
13	PUYEHUE V. PEREZ ROSALES	X	3/C	2/B	3	2/B	3	2	3	2/E	2/E	3/E	2/E	2/E	2	2/E
14	YELCHO	3	4	4	5	5	X	X	3	X	X	X	3	3	X	X
15	LAGUNA S. RAFAEL	X	2/D	4	4	4	3	3	4	3	4	3	4	3	3	3
16	PAINE, O' HIGGINS BALMACEDA	X	5	2/C	2/E	3	2/E	3	2/E	2/C	2/D	2/C	2	2	2/D	2/D
17	PALI – AIKE J. FELD	2/D	2/E	4	4	5	3	5	3	5	5	4	4	3	4	4
18	ALBERTO M. DE AGOSTINI	X	4	4	5	5	3	5	3	5	5	4	3	3	5	5
19	ANTARTICA	3	4	4	5	5	4	5	3	5	X	X	3	3	X	X

ESCALA		PRIORIDADES	
1.	Crítico	A	Primera
2	Urgente	B	Segunda
3	Necesario	C	Tercera
4	Deseable	D	Cuarta
5	Baja Prioridad	E	Quinta

X No se aplica

N/ Los números indican la necesidad de acción evaluada según la escala.

/L Las letras indican cinco prioridades de acción en relación con los otros parques.

Source: Thelen and Miller, 1975.

while many activities may be in action simultaneously, it is important that plans precede field implementation of programs, and that the acutal management programs must be ready to go before administration can be effective. Again, the order of activities was used flexibly to allow for real situations. Ideally, the plans were sought prior to implementation and administration, but some cases required the reverse.

URGENCY is rated on a scale of 1 to 5. A rating of "1" means that the activity in the given park is in "critical" need of action. A "5" means that there is a "low" need for action. The need for action on each management activity for each park was evaluated and rated, a number of 1 through 5 being placed in the corresponding intercept of the matrix. The urgency ratings were then cross-checked with those of all other parks in order to place each need for action into relative perspective with all other parks.

Thus, reading down column one, the Alerzales/Barra del Rio Bueno site has greatest need of all areas for a "new area study." The Altacama, Santiago Andino and Pali-Aike/John Feld areas have great need also but less than the first site. At the Paine/O'Higgens/Balmaceda area in horizontal line No. 16, management planning is of little need because a plan has already been made;[3] nothing in th park is critical, but most other activities are urgently needed if the park is to become an operational reality; construction plans and visitor services are less urgent because many of the required buildings already exist, and current and near-future levels of recreation will not depend upon new structures.

PRIORITIES were assigned taking into account the order of implementing management activities, the limits of management capacity and the scale of urgency assigned to each activity in each park. Five classes of priority are given from "A" to the first or top priority down to the "E" as the fifth or bottom priority.

By reading the Table in conjunction with background information, the planners can present a reasonable narrative of the strategy. The first new area study will be done in the Alerzales/Barra del Rio Bueno area. The Santiago Andino will be second, and the Talca Andino, third. The first management planning team will go to La Campana. Juan Fernandez requires the first program planning work. Los Paraguas/Conguillio is ready and will be given top priority for site planning and the preparation for actual construction projects, drawings and lists of building materials. Lauca gets top priority on physical infrastructure, in part, because of the conflicting irrigation schemes in and around the area. Dominion and control are to be established in Lauca immediately which will require institutional coordination and top priority public relations.

The ratings of URGENCY and PRIORITY were checked by members of the staff of CONAF to search for inconsistency. Eventually, the numbers and letters as shown in Table VII-2 were considered acceptable by the staff. As such, the Table represents an integral view of the strategy of CONAF's Conservation Department during the period from mid-1974 to mid-1975. The strategy was accepted in the CONAF policy on National Parks.[4]

A Suggested Method for Strategy Planning

Based upon this experience, and the aforementioned concepts and principles, a method can be suggested for the formulation of a strategy for achieving the management and development of a system of national parks:

First, delineate the key classes of activities for the management and development of the park system, and place them in the order which is considered ideal for the execution of the strategy. Where plans for individual parks have been made, these activities are described in detail. The general classes of activities for all parks will be similar. While many classes of activities can be implemented simultaneously, most require that previous tasks be accomplished before work on subsequent steps is begun. The order of the management activity classes can be reinforced by departmental policy. The activities are listed in order from left to right across the horizontal axis of a matrix (as shown in Table VII-2). The names of the parks are listed down the vertical axis.

Second, analyze the limits of the park department's capacity to manage the strategy. Manpower, budget, supplies, equipment and other resources are studied to determine which inputs are limiting to the department. Particular skills, vehicles and funds to cover the perdiem of officers on field missions are inputs which are commonly in short supply and set the limits of what the department can do.

Third, for each park, rate the relative urgency at which each activity should be implemented. A scale of 1 to 5 is prepared to show the relative need for action on any particular activity. On a park-by-park basis, each activity is given a rating to demonstrate the need for action on that activity for that park. On the matrix, the ratings for urgency are considered horizontally across the lines for each park.

Fourth, cross-check each rating among the various parks to the system to insure consistency. Reading vertically on the matrix, the planners ask if a particular management activity needs more urgent action in one park relative to another. The numbers are erased and changed until consistency is found both within parks and among parks. It is imperative to invite individuals from different disciplines and different functions to cross-check the ratings.

Fifth, assign priorities to the most urgent activities and parks which realistically can be accomplished given the limits to management capacity. A scale of "A" through "E" is devised to show the priority for action for any activities in any park. All of the needs of the entire park system are considered on an integral basis. The limits to management are taken as absolute constraints to insure that more work is not attempted than can be realistically realized. Similarly, the constraints serve to insure that the managers avoid over-committing certain scarce resources at the expense of other vital park functions. The priority letters are shown as denominators of a fraction beneath those urgency ratings corresponding to the intercepts of activity and parks.

Sixth, cross-check the priorities and insure adequate feedback for continuous use of the strategy. The matrix is to comprise a single statement of "what to do, in what order," given the circumstances of today and estimates abut the future. It is to be interpreted vertically and horizontally to check for consistency. The department director should read from it together with the planning team to consider the implications of following its indications. Again, numbers and letters can be erased and adjusted as necessary.

The strategy matrix should be available for all officers to consult and challenge. All changes in the department's program should be viewed in terms of the strategy. The team should reconsider the priorities in light of the evolving and dynamic factors which influence them. Note, with some exceptions, shifts in money and politics do not bring about changes in the specific management activities for each park (as shown in their respective management plans). Those decisions were based primarily upon technical considerations. What does shift with money and politics are the amounts of work which can be accomplished by the department and the kinds of activities to be implemented at a given moment.

Guidelines for Application of the Strategy Planning Method

The method which has been suggested for helping the director of national parks implement the park system is simple, dynamic and responsive. It is simple in that it can be prepared with a pencil and paper, is non-mathematical, and can be easily read and understood. It can be easily changed and altered to meet dynamic circumstances without the need for involved alterations in long documentations. And it can show the effects of a change in an external factor, such as agrarian reform, or in an internal factor such as budget.

To be useful, the strategy matrix, shown in Table VII-2, should be employed as follows:

a) The strategy should be shown on a large 1 by 1 meter paper and be hung on the wall in the planning room where the teams for park and systems planning meet and work.

b) It should be covered with a sheet of clear drafting paper to allow the director and team members to cross-check and test different ideas. Members of the planning teams can test their ideas on the matrix and note the implications of each change they introduce with colored crayon. For example, if timber prices rise, what will happen to the park system strategy? What about the effects of new rural zoning laws? An increase in the price of beef? Or, if the park department's budget rises ten percent, which additional activities could be implemented? What skills are in short supply; for example what can be shifted around to free up funds for scholarships? If an all-government freeze on hiring is deployed, which projects are liable to be cut? These and other such questions can be asked of the matrix. With a copy of the budget, a list of personnel and a summary of all equipment and supplies, the director and members of the planning team can think through the implications of each possible situation in a logical and orderly manner.

c) It should be kept up to date. As activities are accomplished, the old urgency/priority fraction should be erased and new combinations of numbers and letters entered throughout the matrix as appropriate. Similarly, as internal or external factors change, the appropriate modification in ratings should be made.

d) The internal and external factors which affect the ratings in the strategy matrix should be studied. Knowledge on the relationship between the various internal and external factors (salaries of park officers, skills, budget, gasoline, vehicles, etc., and timber or meat prices, agrarian reform policy, river basin projects, recreation policy, government support for science, etc.) is at best only intuitive. Speculation is an all-to-common substitute for systematic inquiry. Seldom are the many land-use programs put into a rural development perspective which include wildland management concepts and pragmatic solutions. For example, a rise in beef prices need not always promote the increased felling of native tropical wet forests and the collateral wipe-out of an area under consideration for national park status. True, that can be the case, but if the park strategists are knowledgeably involved with the planners of other sectors, they can help work out alternative solutions before problems become ecological disasters.

e) Information on internal and external factors which influence the strategy should be gathered. In addition to the national development plan, the annual reports of governmental departments and autonomous agencies should be carefully checked. Good relationships should be maintained with relevant departments to receive "unofficial" information and unwritten or unpublished indicators of change. New projects submitted to the ministry of economic and the national planning board should be studied and possible conflicts discussed.

f) Each factor should be examined for its sensitivity. Some factors can be shown to be irrelevant. That is, with even large rises or drops in their value, there will be little or no effect upon the park strategy. Others will be shown to have a very sensitive relationship to the parks strategy. With a small rise or drop in variables, such as "the number and quality of trained staff," there will be a great rise or fall in the work which can be accomplished. It is sufficient to use common sense to note which factors actually affect the strategy and how this is manifested.

g) The factors which are shown to be sensitive to elements of the strategy matrix should be given special observation. These factors can be listed on a sheet and placed on the wall next to the matrix in an effort to inform everyone as to which factors are in fact worth worrying about. Data is collected on these factors. Personnel are urged to keep a sharp eye on these factors and to signal headquarters if they note any indications that one of these factors is about to vary.

This is the basis of building a MANAGEMENT MONITORING SYSTEM for the park department, the objective of which is to be informed about a pending change before it strikes. Park departments have long observed internal factors to anticipate budget cuts or the transfer of staff. But seldom have external factors been systematically monitored.

h) The park department must learn how to respond timely and appropriately to such anticipated changes. For example, what is the appropriate response to a government program to promote beef exports? What about an increase in tourism? How should the department respond to increasing desires for use of the national parks for scientific research? When is the best time to "sell" the government on the importance of the park system and hopefully thereby avoid the normal budget cuts at mid-year?

The management monitoring system enables the department to know what to do, when and how, in a manner which keeps the department on the offensive. Only through a comprehensive and strategic procedure can conservation objectives be realized. Alternatively, the department relies solely upon a defensive fall-back position and will leave a legacy of fragments of species and habitats, and contribute only marginally to conservation and development.

This, the strategy plan provides the director of the park , department and his managers with a tool for implementing the national park system plan in an effective manner. The factors which influence the amount and quality of work which can be actually accomplished are explicitly recognized. The strategy enables the department to respond dynamically to the realistic and evolving context in which national parks are managed, and to assist the department in focusing its contribution to ecodevelopment.

The ability of the department to actually implement the strategy and monitor its progress depends upon its MANAGEMENT CAPACITY. What is the nature of this capacity, how does it work and how can it be augmented? This is the subject for Chapter VIII.

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CHAPTER VIII

HUMAN AND INSTITUTIONAL CAPACITY TO MANAGE NATIONAL PARKS

Introduction

Planning tools are designed to assist park managers in making decisions. They are like road maps designed to help automobile drivers find their destinations. The ability to make decisions has been considered to be one of the scarcest of all factors for development.[1] In relation to national parks, this ability refers to designating and implementing the appropriate activities to accomplish predetermined goals. But how does one learn to make these decisions? At first it appears like a vicious circle, not unlike the advertisement for drivers for heavy machinery which states that all applicants should be "young, strong, and have 20 years experience driving bulldozers, cranes and the like." How can one learn to drive a bulldozer if they won't let one use it for practice?

There appears to be only one solution for learning to make decisions concerning the management of national parks, and that is to "leap in and get started, right away." But, like with the bulldozer, one can make a rather large mess during the practice period. With parks it is even more disastrous. The mess will be made of unique, irreplaceable resources which society intended to have set aside in their natural state, forever.

The challenge is to initiate a process within the park department which allows directors, managers and all employees to learn to make decisions. While at first glance this appears easy enough, it is actually complex. To make a decision is simple. To live with the outcome is another matter. Park officers are responsible to the citizenry for their acts. They are expected to be custodians for the nation's cultural and natural wealth. Thus, the job is not just to make decisions, but to implement them and make sure that the results are acceptable. This is management.

The department can rather objectively examine its capacity to manage national parks. Principally, such an examination involves a review of the departments productivity and efficiency. The first dimension looks at personnel to understand the kinds of abilities and skills required. Programs can be designed to develop human capacity for management. Then the capacity of the institution itself can be examined and developed. The office can be organized to permit work to be accomplished more efficiently. Laws, policies, communications, and other characteristics of the institution can be examined and improved.

Critical in developing management capacity is to promote the use of past experience as a basis for improving management.

When a park department begins to consciously try to develop its human and institutional capacity, planning becomes a tool not only for preparing plans but for training personnel on how to make decisions and how to manage. Returning to the analogy of the map and the driver, planning provides the opportunity for personnel to survey the land, draw a map, learn to drive, learn mechanics of automobiles, and then ultimately, take the map and try to follow it with the automobile. With practice, personnel will learn to study the map and assess its usefulness without spending a lot of energy driving around the mountains. And, they will learn to test the automobile before actually leaving the garage and thereby reduce their chances of a breakdown in the field.

A good bulldozer driver will examine the job before starting up the engine. His machine is expensive and he wants to do his task efficiently. Any error he makes is a large one and he wants to minimize the mess he creates. Similarly, the park manager and his personnel need to examine their job and consider the different ways to do it before drawing boundary lines on a map, building recreation areas, or cutting roads and trails. Their capital is also expensive, and their disasters potentially large.

Management capacity provides the department with the means to cultivate and promote decision-makers. It provides an orderly career program for personnel and ensures that the responsibilities and commitments of the park management can be met.

This chapter presents a series of management principles which can guide park managers and planners to organize their work and their working environment in a more productive way. While many of these principles will appear rigid and perhaps even doctrinaire, one would not expect any national park or park department to operate strictly by rules and regulations, or by organization diagrams and written procedures. The intention of articulating management principles is to help managers quickly grasp the ways in which things really do operate, and then discern how to change or adapt the actual management situation to one which hopefully may be more ideal in terms of achieving park objectives.

Basic Concepts of Managerial Capacity

To understand MANAGERIAL CAPACITY -- what is perhaps the most fundamental ingredient in a park management program -- several basic concepts must be made clear. MANAGERIAL CAPACITY is the potential ability to accomplish some particular kind of work, that is, what could be done given the amounts and kinds of resources available. The kind of work of concern here is MANAGEMENT, that is, to make decisions on what needs to be done (including why, how, where and when), and to see that it gets done. This encompasses all of the various skills required to do the many types of activities in developing and operating a national park and a park system.

CAPACITY has two components: First, there is PRODUCTIVITY, the actual work accomplished. Second, there is EFFICIENCY, the percent of actual work accomplished relative to the potential. To be specific:

$$C = \frac{P}{E}$$

where C equals capacity, P equals productivity and E equals efficiency.

Stated more meaningfully, the actual work accomplished (P) will approach the potential (C) as efficiency (E) becomes very high. Park management is efficient (E) when the work actually being accomplished (P) is almost equivalent to the amount possible (C), given the characteristics of the resources available. The productivity (P) is high when the full potential of all resources (C) is being utilized efficiently (E).

A park department may apply the planning techniques suggested in Chapters V, VI, and VII optimally, and it may possess a reasonable amount of budget; yet its park management program will be a success or failure according to its ability to utilize its resources and to do so efficiently.

The fundamental question of interest here is: How can the work accomplished by the park department be increased? The previously noted formula suggests two possibilities:

a) The first case is where the actual amount of work being accomplished (P) by the department is less than what it could potentially accomplish (C). that is, there is inefficiency (E). The actual work must be increased by helping each officer reach his potential. For example, the rangers may only be controlling 60 percent of the boundary. While they may have the potential in personal capacities to patrol all of the boundary, perhaps they cannot do so without better transport facilities.

b) The second case is where the actual amount of work accomplished (P) by the department is at full capacity (C). That is, new transport, additional secretaries, better communications, or any number of improvements could be made and little if any additional work would be accomplished. Generally speaking, this means that the staff are stretched to the maximum of their abilities. The obvious labor-saving devices cannot help them. There are three types of solutions: First, add more staff members; or second, increase the potential capacity of the staff members. A third solution is to do both.

To summarize this point, there are two aspects to the question: If the managerial capacity of park department is low it is because the existing personnel and their support equipment are not working at their potential level, or because the potential level for work is low, or both. In the first case, efficiency is low, and sometimes work can be increased without the need of additional resources by simply improving plans, the maintenance of equipment or the deployment of men and machines. In the second case, even if all elements were working at their full potential, the amount of work accomplished will be low. Additional amounts and qualities of personnel or resources are necessary. In the third case, it is necessary to improve the use of existing resources and augment personnel and departmental resources.

The capacity to manage depends upon the characteristics of the people employed, the funds and other capital goods (equipment, supplies, buildings, vehicles, etc.), and the organizational and institutional tools and context within which management takes place.

Kinds of Personnel Required for Park Management

The kinds of personnel required to manage national parks will depend upon the FUNCTION of management which need to be performed:

a) DECISION-MAKING FUNCTIONS -- Decisions must be made concerning the activities to be carried out, the individuals to whom they must be assigned, the budget to be allocated, and the control of the various activities in terms of their compliance with over-all policy standards and the achievement of goals of the program.

b) MAJOR PROGRAM FUNCTIONS -- Five major groups have been described in Chapter V and together encompass the major activities of park management. These functions include the protection and management of natural and cultural resources and park visitors; the interpretation of park values to visitors; the research and monitoring activities necessary to support management, interpretation and ecodevelopment; the maintenance of facilities and installations; and the administration of all management and development activities.

c) KEY ASSOCIATED FUNCTIONS -- Closely associated with the five major program functions are six associated functions which form the pillars of the park program. These more specific functions deal with the roots of the work to be carried out, such as, the understanding of the resources of the park. The programs also require legislative and policy guidance and analysis of land tenure and acquisition problems. The image of the park department must be presented clearly and accurately to the general public, as well as to those levels of decision-making which affect the park program.

d) PLANNING FUNCTIONS -- To coordinate the above mentioned functions and assure an efficient route to the objectives of conservation, alternative courses of action must be formulated and studied. This requires planning functions which present to the decision-makers the feasible paths to follow in search of the goal. The planning functions are concerned with problems within the park areas, including architecture and engineering, art and exhibit design, as well as management and development questions related to the entire surrounding region, the nation and the international sphere.

Within these four general groups, park management can be divided into some fifteen specific FUNCTIONS as described in Table VIII-1. Each

TABLE VIII-1

FUNCTIONS REQUIRED FOR THE MANAGEMENT OF NATIONAL PARKS

A. Decision-making Functions	1. Determine the most appropriate course of action to achieve conservation objectives, and direct and guide all activities to that end.
B. Major Program Functions	2. Manage and protect natural and cultural resources, park property and all visitors to the park.
	3. Understand the natural (or cultural) resources and advise, assist and monitor their management.
	4. Interpret natural and cultural resources, and conduct educational activities for visitors to the park.
	5. Conduct administrative, personnel, financial and developmental activities of the park.
	6. Maintain installations and facilities in the park.
C. Key Associate Functions	7. Understand the people who visit, or in some way make use of the park, and guide their management.

Table VIII-1 Continued

	8.	Understand and guide the allocation of natural, cultural and financial resources in relation to the objectives of the park.
	9.	Understand the specific natural or cultural resources of the park, their requirements for maintenance, enhancement, management and monitoring, and the effects of internal and external impacts and human use.
	10.	Guide legislative and policy matters.
	11.	Analyze land tenure, and guide the acquisition of lands.
	12.	Project the image of the park beyond its boundaries to the legislature, national and local leaders, and the public. Prepare fund raising activities. And, open and maintain clear communication within the park, among related public agencies, private institutions and the public.
D. Planning and Physical Development Function	13.	Prepare and maintain up-to-date plans for the management, development, operation, organization and control of the park.
	14.	Design and construct the physical facilities of the park.
	15.	Design and construct interpretative, educational and informational materials and facilities concerning the park.

Adapted from: Miller, K.R., 1972. "Development and Training of Personnel -- the Foundation of National Park Programs in the Future." In: Second World Conference on National Parks. Yellowstone and Grand Teton National Parks, U.S. Department of Interior, USA. pp. 328-329.

of these functions needs to be carried out if a park program is to be fully operational. The individual employee which is charged with a particular function takes on a ROLE, as described in Table VIII-2.

Conceptually then, there are 15 roles to be taken in park management, both in the park department and the individual parks. However, smaller and simpler departments and conservation units may need only four or five employees to cover all functions, while larger and complex departments or units may need 10 or 50 officers to cover the 15 functions. For example, the director of an inaccessible wilderness park where little development is required and where little threat is posed to the resources, may take on five or six roles himself, such as manager, biologist, administrative officer, land tenure and acquisition officer, and public relations officer. In another park in the same country, where development may be proceeding rapidly, visitation may be heavy, where considerable research is under way, where complex land purchases and conflicts are part of every day affairs, and where nearby village citizens are in an uproar over the park program, it is probable that an individual officer will be required to take charge of each particular management function.

Therefore, it is important to separate between the FUNCTIONS which need to be covered, and the actual number of officers required to take the ROLES for covering these functions. First, there is the need to analyze which functions need to be carried out for a particular park or department; then, separately, there is the question of how many individual officers are needed to take on the many roles.

All personnel should play a direct part in the management of a national park or the park system. And, all should participate one way or the other in the planning process. If these concepts are accepted, then in addition to their respective technical roles (as described in Table VIII-2) all personnel are in some way both managers and planners.

Therefore, if it can be accepted that this is an ideal towards which to work, then it is not sufficient that individual park employees possess the qualities of a ranger, architect, botanist or administrator. In addition, they must have the qualities of a MANAGER and PLANNER. For example, among other qualities, each member of the staff should:

a) be able to work with a team (TEAM WORK);

b) be able to analyze and evaluate his or her own function and offer suggestions for its implementation, treatment and improvement (ANALYTICAL AND EVALUATIVE);

c) be able to integrate his or her work with that of others (INTEGRATIVE);

d) be able to subordinate the objectives and requirements of his or her own function to those of the overall program (DISCRETIONARY);

e) be able to defend their sector to insure its adequate representation in decision-making (ASSERTIVE);

TABLE VII-2

ROLES REQUIRED TO FULFILL THE FUNCTIONS OF PARK MANAGEMENT

1.	Management	The manager is the director of a given park unit. He or she is leader of the team made up of staff members of the park and on loan from the regional and national offices or other institutions, and must integrated, coordinate and stimulate them to achieve the objectives for which the manager is held responsible. The manager must deal with other agency directors as well as local leaders, and must present and defend the image and programs of the park.
2.	Protection and Management	The park ranger (guard) is responsible for the management and protection of park resources and park visitors. The ranger works with scientists to design and implement the necessary resource management activities. The ranger deals directly with the visiting public, introducing them to the park and guiding them to enjoy their activities in ways compatible with overall park policy. The ranger spends a great deal of time in the interior of the park where he controls and monitors the resources, applies park laws and policies and tends to park visitors.
3.	Ecology*	The park ecologist is responsible for the investigations related to management problems and the park interpretation program. He represents the natural resources found in the park and guides the management program in relation to the adequate treatment of the park's natural values. He spends a great deal of time in the field analyzing

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* Where a park features predominately cultural resources, an archeologist or historian may fill the role of the ecologist.

Table VIII-2 Continued

		resource problems, consulting other members of the staff, and advising the manager on aspects related to overall resource management. He or she coordinates, integrates and directs all cooperative science and monitoring activities within the park.
4.	Interpretation	The park interpreter (naturalist or guide) is responsible for the interpretative and educational aspects of the park program. He or she "interprets" the values and features of the park and presents them to the park visitor in formal and informal ways and in a language and manner which can be understood and appreciated at all levels. Where possible, a team of interpreters can be organized as guides for park visitors and relieve the park ranger of this role. Or, in certain cases, the ranger and the interpreter can combine their roles.
5.	Administration and Accounting	The administrative officer, and the specialists in accounting, are responsible for the overall operational aspects of the park as specified in the management and development plan. They work closely under the manager, report to him on the progress of all physical, institutional and personnel development activities, and the overall personnel and budgetary status of the park.
6.	Maintenance	The maintenance specialist (park engineer) is responsible for the proper functioning and upkeep of the various buildings, grounds, roads, trails, and other installations and facilities of the entire park. During such periods when physical developments are being designed and constructed in the park, the park engineer works in close collaboration with those activities.

Table VIII-2 Continued

7.	Sociology	The park sociologist (recreation specialist) is responsible for the investigations related to the users of the park. He represents the recreationists, tourists and other users, and guides the management program in relation to the treatment of park users. He spends a great deal of time in the field analyzing park users, consulting other members of the staff on recreation, tourism and user problems, and in advising the manager on aspects related to overall user management.
8.	Economics	The park economist is responsible for the investigations related to the allocation and utilization of the park's resources by the various types of park users. He represents the aspects of resource allocation and guides the management program in relation to the adequate understanding of resource and user management. He spends most of his time gathering and analyzing information on park resources, user behavior and preferences, ecological constraints and budgets, and guides the manager on alternative plans of action to meet the goals of the park.
9.	Botany, Zoology, Geology, Anthropology, Archeology, Marine Biology, Oceanography, etc.	The park botanist, zoologist, geologist, anthropologist, History, archeologist, historian, marine biologist, oceanographer, or other specialized fields related to the specific resources of a given park, are responsible for the investigation of particular aspects of the park which are required for support of the park management and interpretation programs. They spend the majority of their time in the field working directly on the problem(s) to be studied, and guide the major program functions and the manager on aspects related to park management and monitoring, and the effects of internal and external impacts and human use.

Table VIII-2 Continued

10. Law, and Resource Policy	The *park law and policy specialist* is responsible for the investigation and support of the legal and policy aspects of the park management and development program. He or she guides the major program functions and the manager in the legal and policy aspects of park management, and works directly on controversial issues related to the overall park program.
11. Land Tenure and Acquisition	The *land tenure and acquisition specialist* is responsible for the study and analysis of land sue within and around park boundaries. He or she works in connection with the creation of new parks and with the annexation of park areas, and guides the manager and major program functions on the feasibility and methodology for acquiring lands for park management.
12. Public Relations	The *public relations specialist* is responsible for drafting and issuing information to the general public, primarily outside of the parks, on the overall park program. He or she prepares materials for publications for general distribution, and aids in the design of speeches and materials which project the image of the park and the park program to other agencies, the media and the public. He or she prepares programs and materials for fund raising to support the park. He or she is responsible for the maintenance of open and clear channels of communication within the park, between the park and regional and national offices, with other agencies, institutes and the public.
13. Planning	The *park planner* is responsible for the preparation and periodic updating of management and development plans for each park, for the park systems plan and for the park department's strategy. He or she advises and assists park

	managers in the preparation of management plans for park areas, and works with engineers and architects in the design and control of physical development. He or she is responsible to monitor the development of human and institutional capacity. He or she is responsible for coordinating the park system and strategy plans and advises the park department director and managers on progress and problems, and suggests alternative courses of action.
14. Landscape Architecture, Architecture, and Civil Engineering	The park landscape architect, architect and engineer are responsible for the design and construction of park facilities and infrastructure. They must work directly in the field and produce installations compatible with the environment. The engineer responsible for maintenance may combine roles with the engineer responsible for physical development where appropriate. Critical, however, is the role of continuous long-term maintenance versus short-term construction activities. Both functions must be covered.
15. Art, Exhibits, and Museum Technique	The artist, exhibit designer and museum technique specialist are responsible for the design and construction of exhibits and materials on the resources, heritage and values of the park, to serve for interpretation and education. In collaboration with the public relations officer, they assist in the preparation of materials for park extension activities and fund raising.

Adapted from: Miller, K.R. 1972. "Development and Training of Personnel -- The Foundation of National Park Programs in the Future." In: Second World Conference on National Parks. Yellowstone and Grand Teton National Parks, U.S. Department of Interior, USA. pp. 331-332.

f) be able to explain to others the significance of the park program, and be able to supervise work activities in the absence of a superior officer (SELF-CONFIDENCE AND LEADERSHIP);

g) be able to identify what activities in the plan need action, gather the necessary resources, and take the initiative to see that the job gets done as prescribed (TAKE INITIATIVE); and

h) be able to report on results of activities in a manner which is meaningful to management and contributes to learning (THOROUGH).

These are perhaps among the most limited qualities in park management. Some of these traits are certainly dependent upon TALENT -- the innate characteristics of individuals. Talent is not created. It must be identified, cultivated and exercised. Another part of these traits is dependent in great part upon EDUCATION and TRAINING. Even the most talented artists and musicians spend years developing techniques and practicing their modes of expression.

The challenge for park departments is to identify innate managerial talent in staff members (and job candidates), and to provide opportunities for training and educating all personnel in the skills necessary to fulfill park functions.

In the field of national parks, most day-to-day activities are implemented at sites throughout vast wildland areas scattered across the entire extent of the country. How then can traits of individual officers be analyzed? Recent experience suggest that personnel can be observed and evaluated in very practical terms during TRAINING SEMINARS and TEAM PLANNING MISSIONS. In both cases, the personnel are provided with tools and techniques for management and have the possibility to try out their talent and newly acquired abilities to face real-world problems confronting the park department. Training seminars and planning missions have the additional advantage over on-the-job evaluation in that the good ideas of the staff members will appear on paper or in debate with colleagues. The bad ideas need not show up on the landscape.

Certainly many traits do not surface or develop until the staff members have passed considerable time in the field. And there is little question that many aspects of an employees performance can most adequately be judged following long periods of observing the employee's continuity and consistency. However, many traits will appear quickly and easily in the environment of training seminars and planning missions where stress and pressure can be intensive and the scenario can be manipulated to create, through exercises, the different circumstances necessary to search for particular traits.

Training Park Personnel to Fulfill Management Functions

Ideally, all staff members should be offered the opportunity to improve their skills and abilities. Which staff members should be trained in which skills? All of the functions suggested in Table VIII-2 are now shown in an idealized organization diagram of a national park conservation unit in Table VIII-3. The decision-making and major program functions are shown to be located directly inside the national park and are divided among the ADVANCED, MEDIUM and BASIC LEVELS. The key associate functions and planning functions may be located within a particular park, in a regional office to be shared by several parks, or at national headquarters to cover the entire park system, depending upon the work to be done.

Some skills are common to all personnel in Table VIII-3 regardless of their particular function. These general skills include such items as:

park history and philosophy
public speaking and debate
report writing
management and decision-making
policy, law and regulations
public relations
programming and budgeting
ecology
principles of the management of park resources
team planning methods
park service organization
objectives, general program and strategy of the park department.

All staff require these types of basic skills. Even the simplest task can be implemented in a way which is more meaningful to the staff member and useful to the park department if the personnel understand their job, feel some confidence in their own abilities, and appreciate the overall context of conservation.

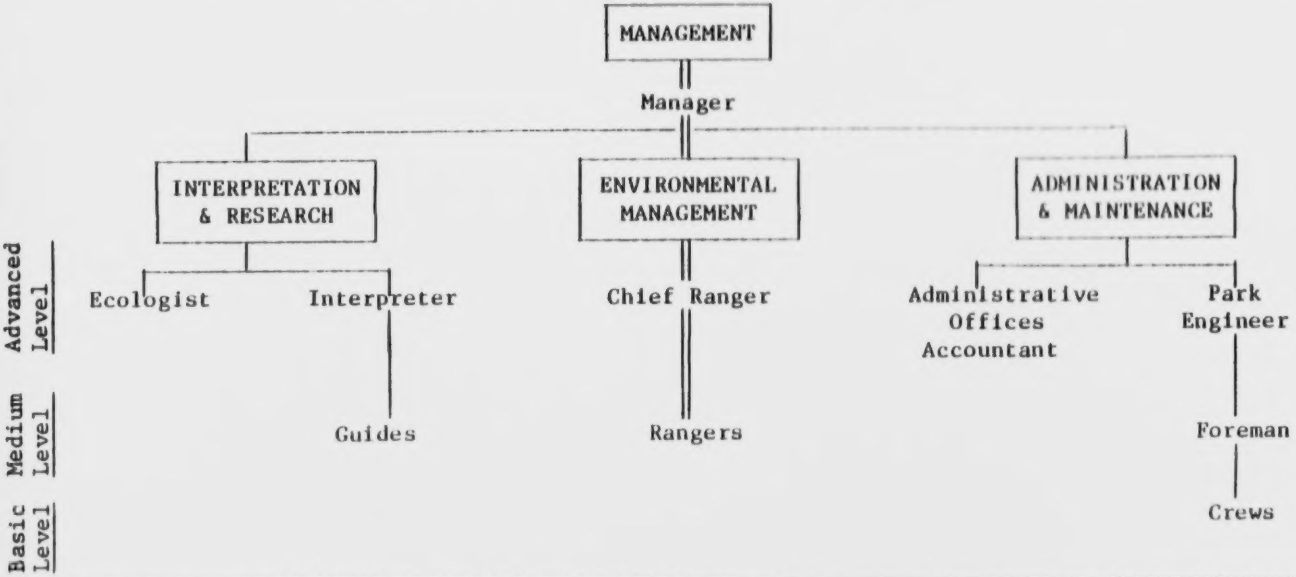
The ADVANCED positions include the manager and the heads of the major functions (chief ranger, ecologist, interpreter, administrative officer, and park engineer). They require special training and experience because they are involved with decisions which relate to day-to-day operations and long-range plans which affect both heritage resources and the public welfare.

The heads of the major functions are specialized according to the particular tasks they will perform. However, they also must possess managerial and planning skills to enable them to carry the responsibility for their respective major functions. They also must be able to integrate their activities into the management of the entire park.

It is from this second echelon of the park staff that future managers can profitably be identified and promoted. These individuals reach the peak of the process for cultivating and training staff. On becoming the key decision-makers for conservation units, they are responsible for the fundamental elements of the national conservation strategy. The individuals who are selected to be managers of

TABLE VIII-3

SCHEMATIC DIAGRAM OF STAFF REQUIRED TO IMPLEMENT THE FUNCTIONS OF AN INDIVIDUAL NATIONAL PARK PROGRAMME



Staff assigned to the individual park unit, to regional or national offices, or on loan from universities or other institutions as necessary, according to the site and the development phase of the programmes

Sociologist/Psychologist
Economist
Botanist
Zoologist
Marine Biologist
Oceanographer
Geologist
Archeologist
Anthropolotist

Historian
Lawyer/Policy Specialist
Land Tenure and Acquisition
  Communications
  Public Relations and Fund Raising
Planner
Architect
Landscape Architect
Civil Engineer

Art
Exhibit
Museum Technique

conservation units should have had experience with one or several major functional roles in park management. They must have the insight to bring together and integrate many functions into one.

The personnel of the management and major functions come originally from such disciplines as forestry, agronomy, biology and administration or from park positions of long field experience. The cultivation and training process adds to their background those skills which were not part of their original formal education or experience. In the end, they become "park managers" with particular experience in one of the major program functions (protection and resource management, interpretation, etc.). They have become generalized into a new specialization!

The staff of the key associate functions can be considered to be members of the ADVANCED LEVEL in the sense that they are highly specialized in formal disciplines, such as botany, zoology, geology, archeology, etc. While they are highly educated, however, they do not occupy decision-making positions. They study, consult, advise and inform. They are typically drawn from university faculties, research institutes or other public agencies. They must be able to integrate their restricted views with that of the whole park, and be able to work effectively within the context of a planning team.

The MEDIUM and BASIC LEVELS of personnel are located within the major program functions. They are responsible for field implementation and operations. While their skills are often limited, their field experience is considered by many to form "the backbone of the park system." They are the men and women who are "on the line." They work with management and planning almost daily, and may at times carry considerable responsibility. Their training must reflect this close relationship with decision-making. While they are located in the lower echelons of the park, they are directly tied to the top because they fulfill vital managerial functions.

In addition to the general skills suggested above, several skills are suggested for each level of staff. Table VIII-4 presents the skills which should be possessed by ADVANCED staff members, and officers related to the key associate and some of the planning functions. Table VIII-5 presents the skills to be possessed by the MEDIUM and BASIC LEVEL staff.

Training experience in Latin America has been primarily local and restricted to particular countries, themes and parks. There have been some notable exceptions with regional and international seminars, courses and workshops. The two oldest and most continuously running training centers at the medium level are the Ranger Training School in San Carlos de Bariloche, Argentina and the Technical Training Center in Conocoto, Ecuador. The Bariloche School has been preparing national park rangers for the Argentine park system and neighboring countries. Since the School's opening in 1968 through the 1977 course, 130 individuals have graduated from the 9-month course.[2] Following a recent interruption, the School has been transferred to Victoria Island, in the Los Arrayanes National Park. The Conocoto School has trained 141 individuals from Ecuador and other countries in their 2-year

TABLE VIII-4

CATEGORIES OF SPECIFIC SKILLS REQUIRED BY ADVANCED-LEVEL PERSONNEL IN PARK MANAGEMENT

	University degree or equivalent	Secondary or Technical training	General Introductory Skills (VI)	Leadership	Advanced park planning	Advanced decision-making	Advanced budgetary methods	Advanced policy	Key related fields *	Intermediate/advanced resource, management and economics	Intermediate sociology/psycology	Survival, rescue, emergency procedures	Law enforcement, regulations	Patrolling techniques/problems	Techniques of meeting & handling public	First aid	Standards/norms for park design, construction and maintenance	Sensitivity to ecology and the landscape	Maintenance methods/problems	Principles of interpretation	Communications, audio-visual aids	Exhibits, design & construction	Advanced applied techniques of interpretation	Park administration, methods/problems
1. Management	x		x	x	x	x	x	x	x	x	x				x			x						x
2. Protection/Resource Management	x		x	x	x				x			x	x	x	x	x								
3. Design/ Construction	x		x	x	x				x						x		x	x	x					
4. Interpretation	x		x	x	x				x		x				x					x	x	x	x	
5. Maintenance	x	x	x	x	x				x						x	x	x		x					
6. Administration	x	x	x	x	x		x		x						x									x
7. Ecology	x		x						x						x									
8. Sociology/ Psycology	x		x						x						x									
9. Economics	x		x						x						x									
10. Botany, etc.**	x		x						x						x									
11. Law/Policy	x		x						x						x									
12. Land Tenure/ Acquisition	x		x						x						x									
13. Public Relations	x	x	x						x						x				x	x	x			
14. Communications	x		x						x						x				x	x	x			
15. Planning	x		x	x	x	x	x	x	x	x	x				x			x						x

* Such specific fields as geology, marine biology, agrarian reform, resource policy, etc., which are fundamental to the assigned tasks, and vary from park to park, and country to country.

** Zoology, Marine Biology, Geology, Anthropology, Archeology, History, Oceanography, etc.

Source: Miller, K. R. Development and Training of Personnel -- The Foundation of National Park Programs in the Future. Second World Conference on National Parks, Yellowstone and Grand Teton, U.S.A. 1972. p. 335.

TABLE VIII-5

CATEGORIES OF SPECIFIC SKILLS REQUIRED MEDIUM AND BASIC LEVELS IN PARK MANAGEMENT

	Secondary or Technical Training	Primary School	Medium Level General Introductory skills	Basic Level General Introductory skills	Leadership	Survival, rescue and emergency procedures	Intermediate Law enforcement/regulations	Intermediate Patrolling technique problems	Techniques of meeting and handling public	First aid	Standards/norms for park construction/maintenance	Principles of Interpretation	Communications/audio-visual aids	Exhibits design/construction	Collection/classification/storage of specimens	Intermediate applied techniques of interpretation	Art/displays/murals
Medium																	
Park guard	x		x		x	x	x	x	x	x							
Construction Crew Foreman	x		x		x	x				x	x						
Artist	x		x									x	x			x	x
Exhibit Spec.	x		x								x	x	x	x		x	
Museum Tech.	x		x									x	x		x	x	
Park guides	x		x		x	x	x	x	x	x		x	x				
Maintenance Crew Foreman	x		x		x					x	x						
Accountant	x		x			x											
Basic																	
Construction Crew		x		x		x				x							
Maintenance Crew		x		x		x				x							

Source: Miller, K. R. Development and Training of Personnel -- The Foundation of National Park Programs in the Future. Second World Conference on National Parks, Yellowstone and Grand Teton, U.S.A. 1972. p. 336

technical-level ("perito forestal") course which includes materials related to ecology, park and wildlife management.[3]

Other medium-level schools are operating in Escuadron, Chile; Siguatepeque, Honduras and Piedras Blancas, Colombia. These centers include some materials on national park management although their potential for expansion to include wildland management has been considered repeatedly.

The longest continuously running university-level program in national parks and wildlife management in the region has been operating in the La Molina National Agrarian University, in Lima, Peru. Since 1964 courses have been offered to forestry students, many of which choose employment in the Conservation Department of the General Forestry and Wildlife Directorate.

Other university courses in parks and wildlife or conservation are, or have recently been offered at the forestry schools in Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Uruguay and Venezuela. And in the agronomy or biology schools of Bolivia, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua and Panama, general courses in conservation have been part of the regular curriculum for many years.

Special courses of short duration have operated at the national, regional and international levels. Most notable among the national-level periodic training courses are those operated in Peru by the General Forestry and Wildlife Directorate, the Forestry Faculty of La Molina, with the cooperation of FAO, the World Wildlife Fund, and various bilateral projects from Europe and North America. Since 1964 these courses have been operated to prepare guard personnel to implement new national parks and reserves and wildlife management programs. In Chile, the National Forestry Corporation, in cooperation with FAO, has held training courses for management and guard personnel since 1970. Brazil, Costa Rica, and Ecuador have held training courses to meet particular needs.

In conjunction with the design and implementation of Brazil's strategy summarized in Chapter VII, the Brazilian Forestry Development Institute, in cooperation with the Brazilian Nature Conservation Foundation (FBCN), held a major seminar for all park management staff in October 1977. The program was designed to introduce the officers to the strategy and to the principles and techniques involved in planning individual parks and park systems.

As for regional-level training and education programs, for more than two decades the Tropical Agricultural Center for Research and Training (CATIE) at Turrialba, Costa Rica (formerly, the Research and Training Center of the Inter-American Institute of Agricultural Sciences of the OAS), has been offering post-graduate courses in conservation, national park management and wildland management as part of the Forestry Sciences curriculum. The U.S. Forest Service, Tropical Forestry Institute at Rio Piedras, Puerto Rico has given training opportunities to some 250 individuals from some 25 countries since 1953.[4] While most training has dealt with general forestry, attention has been given to conservation and integrated use of forest land including wildlife and wilderness management.

The Argentine National Park Service held the "Inter-American Course on National Parks and Conservation and Protection of the Renewable Natural Resources of the Americas," in 1966.[5]

The Latin American Committee on National Parks (CLAPN) has sponsored four regional courses on the management of natural areas and tourism. The first course took place in Puerto Rico, Virgin Islands and Dominican Republic; those which followed were held in the Argentine province of Chubut. As part of the CLAPN meetings, technical working sessions are held which involved considerable training activities.[6]

The U.S. National Park Service operates a training center, as well as several specialized centers in planning, administration and interpretation for the preparation of its own staff and the operation of its extensive park system. Invited professionals from Latin America and elsewhere have participated in the 75 courses, seminars and workshops geared to the continuous and progressive improvement of staff proficiency in such aspects of park management as leadership, ecology, operations, planning, administration, interpretation and communication.[7]

Since 1964, the "International Seminar on Park Administration" offered jointly by the Park Service of the U.S., Canada, and Mexico, and the University of Michigan (and the Conservation Foundation during the first years), have received 386 individuals from 79 countries throughout the world. The four week course covers the major aspects of park management and travels to examples in Canada, the United States and Mexico.[8]

The activities of the FAO-sponsored First and Second International Workshops on Wildland Management were already reviewed in detail in Chapter IV. Together with the forestry or agronomy faculties of nine southern South American universities, curricula were initiated in the field of wildland management, national parks, wildlife, or similar subject matter. Some of the faculty members which were trained by the two, intensive 3-month workshops have established wildland management programs as a regular part of their respective faculty curricula; several others have initiated periodic courses or have added conservation topics to other regular courses. As one result of these courses, many advanced forestry students have selected to prepare their theses on national park management. The National Forestry Corporation in Chile cooperates by offering financial and logistical assistance for summer employment to forestry students during which time the students may also prepare their thesis materials. Many graduates from programs such as these around the region are now directors of national parks, regional offices and national-level departments.

Among the several important differences between the FAO Workshops on Wildland Management and other seminars and workshops already enumerated above, one is particularly significant to this Chapter. The participants were introduced, instructed and tested in the methods and techniques of planning and decision-making. The exercises were designed to make the participants aware of what exactly management consists of, how management should be done, the role of planning in management, and how to plan. As a final project on both Workshops, the participants prepared management plans for existing national parks, and had to prepare and defend them to the Director of the National Forestry Corporation in one case, and to the Minister of Agriculture of Argentina in the other. Within such training environs, managerial traits of each participant could be observed.

Several of the participants carried the methods and techniques to their home institutions (universities and park departments). In the case of Chile, for example, the Director of the Conservation Department of CONAF and his directorate staff held biannual training meetings for park personnel under field conditions. The performance of the participants was keenly observed, and the managerial capabilities of several individuals were noted. Once corroborated with evaluation of the individual's traits from other sources, these individuals were promoted and assigned greater responsibilities.

Organizing the Capacity of a National Park Department to Manage National Parks

Wetterberg[9] reviewed the organizational structure of park institutions in South America and presented organization diagrams of each. He also examined management problems and possible solutions in each country. His analysis was based upon interviews with the directors of high-level personnel from the park departments. His work makes it clear that it would be naive to propose one single approach for organizing conservation efforts in all countries.

However, two specific aspects of organizing park departments can be generalized: First, a park department must be able to utilize its resources efficiently; and second, a park department must develop the capacity necessary to manage natural and cultural heritage resources as appropriate. These two aspects are interrelated since, for every level of capacity attained by an organization, there is a particular level of efficiency to be attained. In other words, when a new jeep is purchased, the department will be able to do more work if it employs the jeep well.

The concepts of efficiency, productivity and capacity should be clearly understood. Unfortunately, it would be very difficult to measure these qualities of park institutions. To be objective requires that values are given to the costs and the benefits produced by the department. In the discussion in Chapters II and III, this was shown to be inadequate at this time.

Alternatively, eight guidelines are suggested to orient park officers on how to analyze and evaluate their own department and build improvements in efficiency and capacity:

1) The park department should be organized to permit and encourage the flow of information and feedback. Can the directives from

the top, flow downward to all individuals in the organization? Can suggestions from lower and middle levels flow upward? How is criticism from inside or from outside the organization treated? Are there regular meetings of personnel in the central, regional and park offices? Does anyone ever read the reports of officers on their field work and study tours, the annual reports of particular parks or on the department itself?

Figure VIII-1 illustrates the flow of information in an organization. Typically in most organizations there are LINES OF COMMUNICATIONS which are absent or under-developed. Some LINES work only intermittently. Others only work on a one-way basis.

By preparing diagrams such as that of Figure VIII-1, it is possible to test an institution to evaluate if lines of communication are developed as necessary to permit a FLOW OF INFORMATION. Then the test continues by tracing specific messages as they flow from office to office, from office to the field and vice-versa. and by verifying exactly where the messages pass, who becomes involved and where does the information finally rest? It is possible to determine how messages are flowing along the lines of communication.

The lack of a full network of lines of communication reduce the efficiency of the park department by isolating sectors of the institution. For example, the directors may be uninformed about the field activities and the welfare of the personnel. The reverse is also common where the field staff may be uninformed about the directors. Commonly, both the directors and the field staff deal in rumors about each others ideas and concepts. In terms of conservation and development, the isolation of a sector of the institution raises the risk that the sector becomes alienated from the conservation objectives. An isolated sector cannot be expected to be responsive and sensitive to critical issues. Moreover, the lack of communication and interaction reduces the opportunity for personnel to grow and gain new and creative experience. Experience can become repetitive and monotonous. For example, two field officers can have 20 years of experience in park work. However, one may have 20 years of varied, rich and exciting experience on a multitude of problems even though his range of activities and his routine are limited. the other officer may have the experience of one year, repeated 20 times. The key difference is the linkage of communication with the rest of the organization.

2) The park department should be organized to be able to relate to other institutions. In order for the department to be part of the conservation and development thrust of the country it must be a member of the community of institutions working on conservation and development problems and programs. Have LINES OF COMMUNICATION been established with other institutions? Is there a FLOW OF INFORMATION in both directions? Is the department represented on inter-departmental commissions on specific problems or regions? Does the department participate in a meaningful way? Is there effective cooperation with other agencies towards common goals? If not, why not?

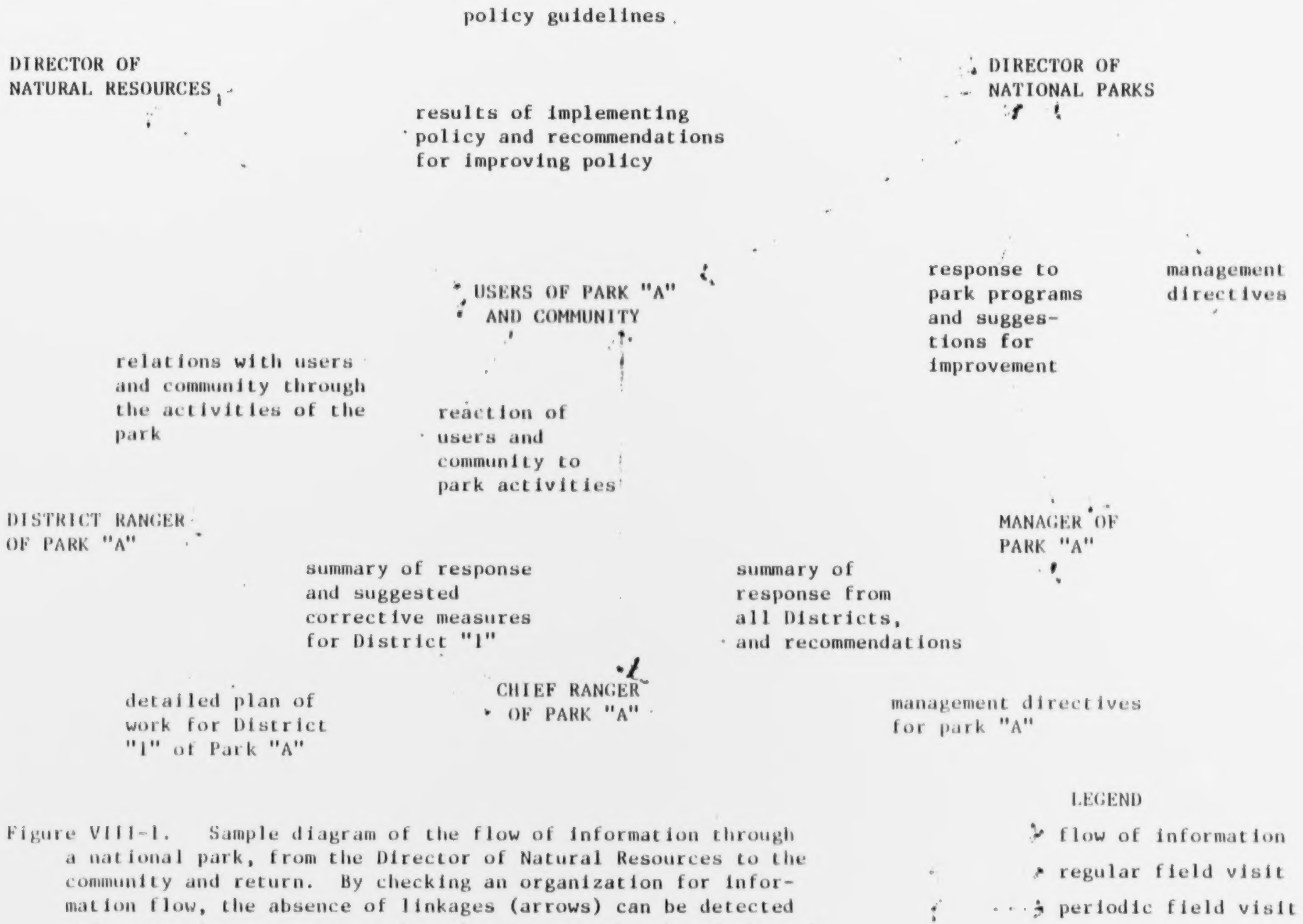

policy guidelines
DIRECTOR OF NATURAL RESOURCES
DIRECTOR OF NATIONAL PARKS
results of implementing policy and recommendations for improving policy
USERS OF PARK "A" AND COMMUNITY
response to park programs and suggestions for improvement
management directives
relations with users and community through the activities of the park
reaction of users and community to park activities
DISTRICT RANGER OF PARK "A"
MANAGER OF PARK "A"
summary of response and suggested corrective measures for District "1"
summary of response from all Districts, and recommendations
detailed plan of work for District "1" of Park "A"
CHIEF RANGER OF PARK "A"
management directives for park "A"
LEGEND
flow of information
regular field visit
periodic field visit

Figure VIII-1. Sample diagram of the flow of information through a national park, from the Director of Natural Resources to the community and return. By checking an organization for information flow, the absence of linkages (arrows) can be detected and corrective measures can be taken to open the closed channels of communication.

The test for this guideline is to prepare a list of the critical conservation problems of the country. Examples might include soil erosion in the upper river basins, destruction of mangroves and coastal lands, spontaneous colonization in the tropical forests, the loss of genetic resources, the development of environmental education, etc. Note which agencies are working on these problems. Then determine which of these problems fall into the terms of reference of the park department. Is the park department involved in any realistic and pragmatic sense? How? Is the department cooperating with the other agencies also working on the same problems? This is not to advocate "cooperation" for its own sake, but only when it would contribute to national conservation and development, effectively. Certainly, there are cases when institutions specialize in problems and interagency cooperation is not warranted. However, since most environmentally-oriented work is inter-disciplinary, usually it requires inter-institutional cooperation.

The same guideline applies in concepts to relationships with institutions from neighboring countries which share common resources and problems of resource management. This matter will be explored in Chapters X, XI and XII.

3) The park department should be organized to relate to the public. Under the principles of antional parks, the natural and cultural heritage resources are managed for the benefit of society by a specialized public agency. In principle, the public is the owner of the park. To be an effective manager of these resources the department should be well acquainted with the public's desires and perceptions. Similarly, the public must have access to information on the park department and be able to participate somehow in the management of the resources.

Two elements can be examined: First, have LINES OF COMMUNICATION been established between the park department and the general public and the various non-governmental organizations which represent the public interests? This is particularly relevant on matters of policy. Take a particular policy issue and trace it from the department to non-governmental organizations, newspapers, and the general public. Is the public aware of the policy and why it has been adopted? Conversely, is the department aware if the public supports the policy?

Second, have mechanisms been developed by which the department and the public can relate to one another? One obvious method is the "public meeting" which has been used effectively in Costa Rica, Cuba and elsewhere. In such cases, citizens from a local area are invited to examine and debate new policies or project proposals which may affect their lives.

Both these aspects will apply according to particular circumstances of the country. Cases do exist where the citizens of local areas are unprepared for such involvement in public affairs. However, this rationale has been utilized too often to simply avoid the "inconveniences" of dealing with community interests.

The efficient deployment of the management capacity of the park department requires public involvement and mutual understanding. After all, the department has been created by society to serve societies' ends.

4) The park department should be organized to relate to the national planning board. Since the Alliance for Progress, and more recently, the establishment of the United Nations Development Program's procedures on "Country Programming" adopted by the member nations on December 11, 1970,[10] all development assistance and cooperation from the United Nations agencies (FAO, Unesco, WHO, etc.) and many adhering bilateral agencies are coordinated through one, single development program per country. Each nation prepares its own list of project requests and assigns priorities for funding. To deal with this complex task, most nations of Latin America have established a planning office as part of the central government.

The establishment of the United Nations Environmental Program in 1972 further reinforced the move towards the coordination of development activities and funding by the governments themselves, particularly where environmental aspects of projects are of national, regional or international interest.

Furthermore, many countries have adopted national procedures and policies which require that all requests for technical and financial cooperation from international sources must pass through the national planning office. In such cases, the matter is straight-forward. For the park department to obtain technical and financial cooperation from international sources, it must go through the planning office.

Other reasons exist for a park department to work with the planning office. Most planning offices now coordinate national-level development programs and projects even where no international or bilateral assistance is involved. These offices assign priorities for internal funding, scholarships, importation of specialized equipment, study tours, international technical meetings, etc. The ministries of finance or economy generally await the planning office's integrated annual program or special approval before financing particular activities.

Two conclusions stand out. If the park department wishes to obtain funding from international or national sources, in most countries it must work closely with the national planning office to explain its objectives and proposals and to defend them. And, if the park department is to contribute to the environmental welfare of the nation then it would do well to work within the coordinating function of the planning office.

To check on this guideline: First, is the park department aware of the procedures of the national planning office concerning annual programming and the submission of project requests to national and international sources? Second, is the planning office aware of the objectives and program of the park department? Third, can the directors of each explain how the management of national parks interrelates with national development goals? More specifically, trace through the procedure for submitting annual programs from the park department to the planning office. Verify the awareness of employees in both by asking them about planning and coordination procedures, and about the role of conservation in development. Unfortunately, the answers to the three questions will be found to be negative in most countries. Some generalizations will be given, but little practical interchange and mutual understanding will have been developed.

5) The park department should be organized to permit integrated team work on park and park systems planning. There are many important benefits to be derived from planning. Most importantly, team planning provides a mechanism to develop management capacity by training personnel on how parks and park systems work. It provides an opportunity to identify and cultivate personnel for decision-making roles. Team planning allows for interchange of ideas, concepts and philosophy across the park program and from upper levels to field officers and vice-versa.

It is a normal tendency to centralize the PLANNING FUNCTION. The planning role can usefully be vested in one or two individuals who receive specialized training. However, when actual planning is concentrated in the hands of these specialists of the central office, the quality of its management should be subjected to question. The reasons should be obvious. In such a case of strong centralized planning, the field officers would have only a marginal involvement with the planning process. The field personnel would not have the opportunity to learn about management through experience in planning. They would not necessarily comprehend what is expected of them. And, the plans and planners would not benefit from all the experience accumulated by the field personnel. Ultimately, if the planning function remains concentrated and overly centralized, experience shows that park plans can become development-oriented, management can become repetitive and "rubber stamped" from park to park, innovation and creativity can become limited to the architectural aspects of planning, and learning can fall to a minimum.

The solution lies neither in over-centralization, nor in having rangers draw park plans. Extremes are unacceptable when national heritage is at risk. Combinations are easily evolved. For example, an officer from the park headquarters can specialize in planning. He or she then acts as a member of each planning team and coordinates planning for the department. Carefully chosen, this officer can stimulate the active involvement of the field personnel in each planning mission. Initially, the planning officer will have to do more actual work himself than would be appropriate, but as team members gain experience and confidence he or she will become the coordinator or secretary of the team.

To apply this guideline: First, are there policies or organizational structures which prohibit or inhibit team planning? Second, are there prevalent attitudes against team work and team planning? Third, will the existing administrative procedures allow for team activities? For example, can travel authorizations and perdiem be given to several officers to go to the same place for the same reason at the same time?

6) The park department should be organized to benefit from the contributions of each employee. To provide lines of communication gives the potential for the interchange of ideas and information among employees. However, to make it operate, employees must be encouraged to express themselves. They must be given the opportunity to develop positive and creative ideas. For example, field officers generally have field experience not possessed by the managers and directors. Employees must be given the opportunity to contribute unique perspectives and experience within a structure which supports the making of decisions. The managers and directors can invite employees from all levels to participate in team planning missions when in the area of the individual officers. But, the managers and directors must provide a structure for the planning process. The responses of the field personnel may be non-systematic at first, but they can become structured by the use of planning methods such as those suggested in Chapters V, VI and VII. Through this process the field personnel can learn how and when to support decision-makers, they learn from where decisions come, and to where they go. For most, this would be an exciting novelty.

A premise lies behind this guideline. Directors and managers need the field officers as much as the field officers need the directors and managers. Stated differently, both kinds of individuals are required to manage national parks -- those with the structured and the theoretical knowledge on the one hand, and those with the practical field experience on the other. Personnel with both must be employed and developed. The challenge lies in developing creative and innovatory means to link both kinds of individuals into an organized program to manage natural and cultural heritage resources.

The tests for this criteria are as follows: First, what incentives are there for lower-level personnel to participate in decision-making? What practical means exist for them to participate? Are there any cases where it can happen? Second, is there explicit recognition among directors of the value of the field officers' unique experience? What means are utilized to express this? Are these means patronizing, or practical? Third, are the field officers sympathetic to the problems and challenges faced by the directors? Is this general, or are there specific cases of employees taking the initiative to support their directors?

7) The park department should be organized appropriately to do the work necessary to meet its objectives. Aside from limitations on funds, equipment, vehicles, supplies, personnel and the problems already mentioned in the six preceding guidelines, an institution can be organized inappropriately in a manner which makes it difficult or impossible to do what is considered necessary. Most critically, this problem of inappropriate organization often goes unrecognized. The inconsistencies which arise because of it are usually blamed on other factors such as the "limited budget."

Examples of inappropriate organization include those cases where national parks are managed by a department which is also charged with the management of other resources or enterprises which compete with the conservation objectives of parks. This often occurs where parks are managed within organizations also in charge of tourism or timber production. As was examined in Chapter I, *this conflict is not necessary nor is it inherent in attempting to combine these various services or products under one institution*. The problem arises because institutions have yet to develop a conceptual framework and the practical procedures which provide for several categories of wildland management, each of which is viewed as legitimate. Until these inconsistencies are removed, parks will always be in conflict with the management of resources for other purposes by the very nature of the institution.

Another example of inappropriate organization includes cases where regionalization has fragmented decision-making and responsibility to the extreme where national heritage resources are handled differently in each region irregardless of national policies to the contrary.

It is unwise to generalize and propose an ideal organization for the management of national parks. Examples of all types of organizational structures exist and apparently work reasonably well in their particular context. Some are autonomous, others lie within tourism institutes, natural resource institutes, and ministries of the environment. Most are within forest services in ministries of agriculture.

In order to test for appropriateness of the organization within which the national parks are to be managed, it is useful to prepare the conceptual framework of a park system plan as outlined in Chapter VI. The conceptual framework examines the objectives to be addressed and the responsibilities to be carried by the park department and other organizations. Taking this as the ideal, examine the existing organization of the park department to search for inappropriate policies, laws, procedures and structures.

FAO consultant Evans[11] studied the national park program of Chile for the National Forestry Corporation (CONAF), and noted an example of inappropriate organization and the search for solutions. Particular attention was given to legislation and policy. Apparently, CONAF is virtually a private organization ("*de derecho privado*") and does not have the legal attributions of a State Organization. CONAF employees, in particular the national park rangers, do not have the legal authority to inspect and to control infractions in the national parks. Evans notes:[12]

> It is necessary to recall attention to the fact that a park guard is basically, purely and exclusively, the representative of the National Executive Power within the physical area of the National Park. He ought to be a public civil servant with specific functions and attributions in the park. For these reasons, a continuous vertical line should exist which initiates from the President of the Republic and arrives at the park guard, passing through the Ministry, Department, Region, Area or whatever, but without interruption. This is not the present situation in Chile.

8) Finally, the park department should be organized to accept and carry the responsibility of custodianship for the natural and cultural heritage of the nation. The capacity to manage requires an ability to respond to regular daily needs, as well as emergencies and sensitive situations. Who decides when to do what? Who decides when something is an emergency? Basically, who gives the order, and who follows? Under who's authority are the orders given and carried out?

The highest body of government has established national parks by law or decree. Such laws and decrees must be carried out. A director of national parks is employed and charged with managing and developing the park system. He in turn employs park directors, various specialists, rangers and workers with various skills and levels.

The relationship among these individuals is implicit in Table VIII-3. To follow Evans' reasoning, the responsibility emanates from the Office of the President of the Republic, who represents the owners and beneficiaries of the national parks. An example of this structure is shown in Table VIII-6. The heavy line from the President through the park directors to the district ranger is unbroken. The LINE OF COMMAND is a chain which links decision-making to action under the necessary authority. In the case of national parks, the department director has authority from the President to the Republic to act as custodian of national heritage resources. By the DELEGATION OF AUTHORITY, the director divides his or her complex responsibility among various subordinate officers who carry our particular functios of the overall custodianship mandate. Conceptually, every officer in the line of comman is linked to the authority vested in the director and the President by the people and their governmental instruments (constitutions, laws, international treaty, etc.).

In Table VIII-7, an idealized organization diagram of a national park shows the line of command or LINE POSITIONS and the advisory/technical support or STAFF POSITIONS. These are often conceived as VERTICAL and HORIZONTAL positions as suggested by their orientation in organization diagrams.

Line positions bear the responsibility of deciding and implementing the strategy of the park department. They are advised by and receive technical support from ecologists, architects, planners, economists and accountants, but only the line position officers can make decisions on management and development. While all personnel have responsibilities, it is the officers on the line of command who must answer to higher levels for their action (or inaction).

The tests for this guideline are to draw an organization diagram along the lines of Tables VIII-6 and 7, and to analyze how the line of command actually flows from the Office of the President of the Republic, down to the district ranger. Then, describe and analyze the LINE and STAFF positions for the park department and for an individual park. Does the line really work in practice? Ask questions of the department's experience. When the director is given an order, where does it go? Who acts? How does the director get his reports? To whom

TABLE VIII-6

CONCEPTUAL "LINE OF COMMAND" FOR NATIONAL PARKS

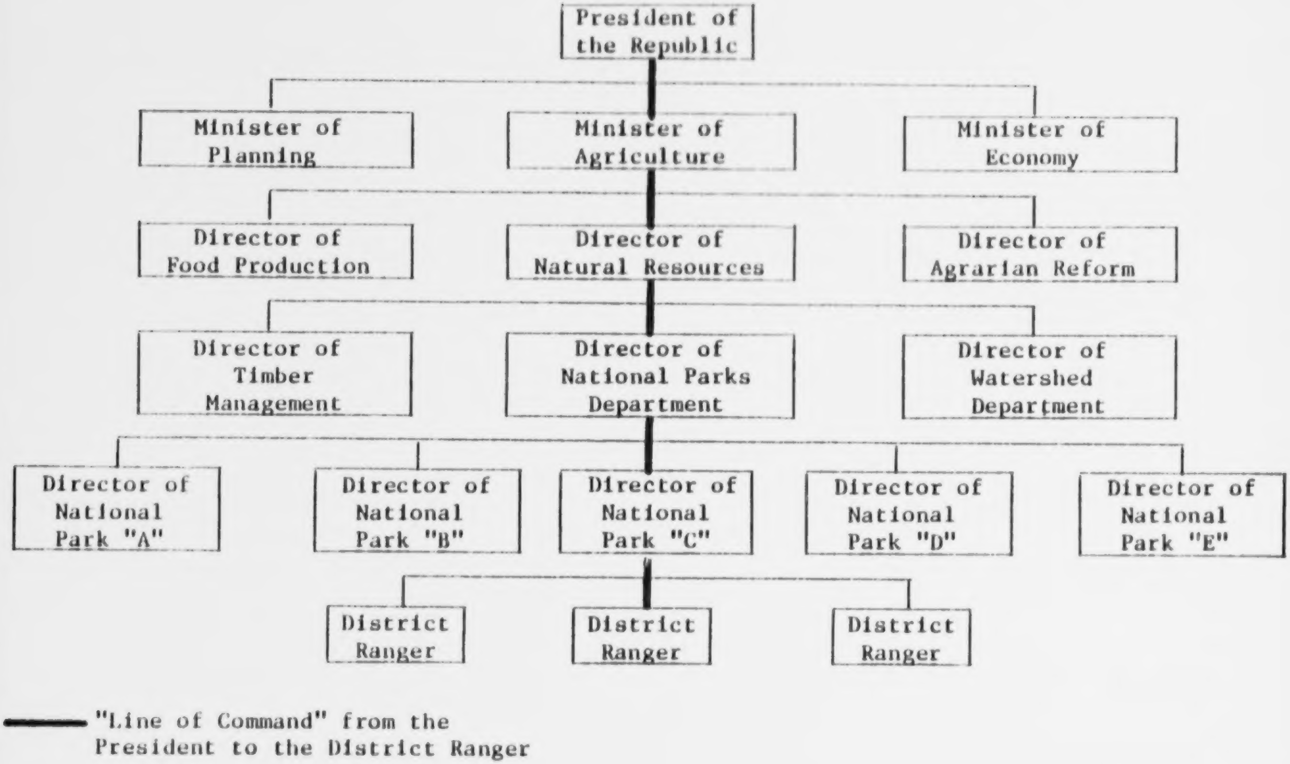
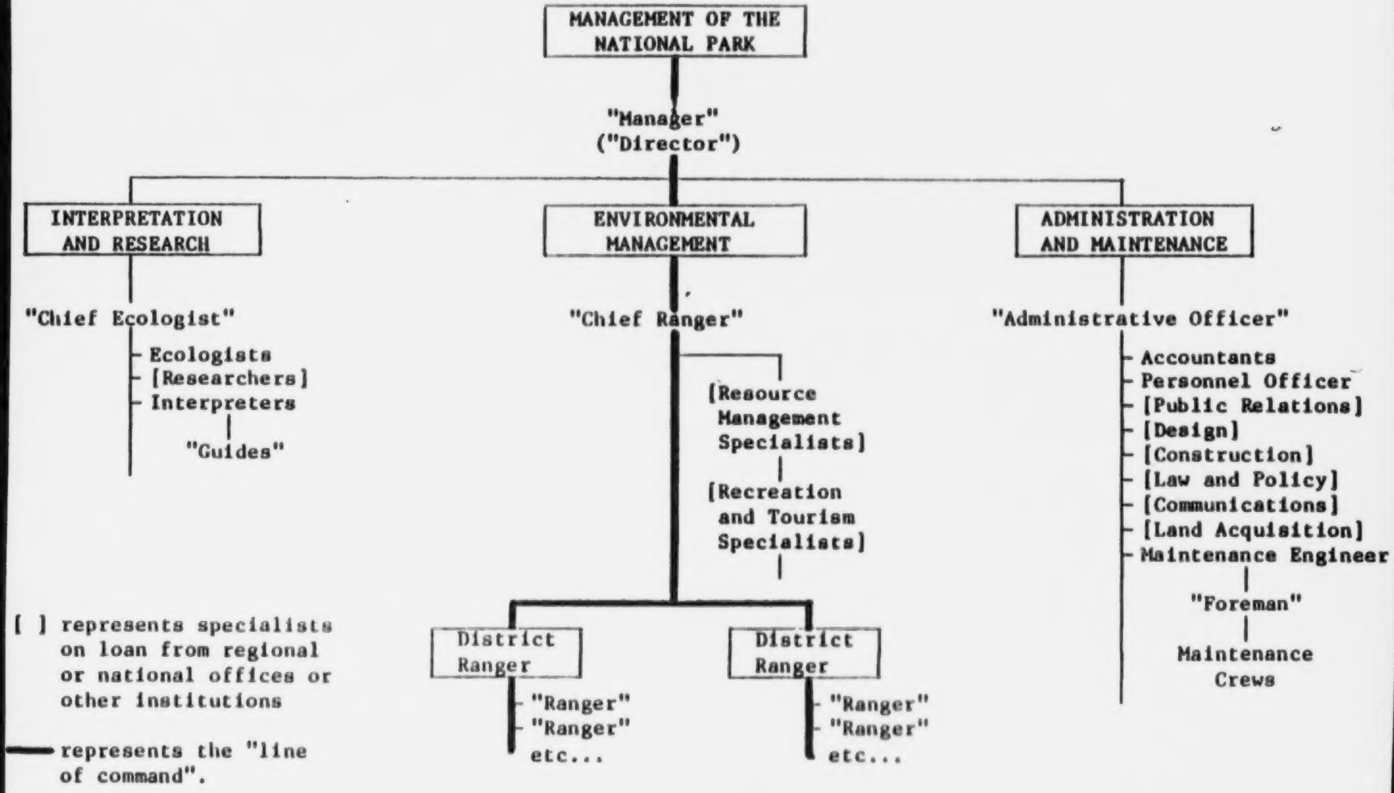

President of the Republic
Minister of Planning
Minister of Agriculture
Minister of Economy
Director of Food Production
Director of Natural Resources
Director of Agrarian Reform
Director of Timber Management
Director of National Parks Department
Director of Watershed Department
Director of National Park "A"
Director of National Park "B"
Director of National Park "C"
Director of National Park "D"
Director of National Park "E"
District Ranger
District Ranger
District Ranger
"Line of Command" from the President to the District Ranger

TABLE VIII-7

IDEALIZED ORGANIZATION OF A NATIONAL PARK SHOWING "LINE" AND "STAFF" POSITIONS



does he report? Are there deviations in the LINE? Are there STAFF officers acting on the LINE? Or are LINE officers side-stepping the authority? A very common deviation is where administrative staff officers slide into the LINE, apparently because of the vacuum caused by a weak LINE officer. The danger is obvious in that the criteria of a specialist with narrow vision and concerns can be interjected into the decision-making line where integral management criteria are required.

Institutionalization of National Parks

The national park department can attain the capabilities necessary for the development of trained and appropriately organized personnel. However, to make the park department a permanent body capable of carrying the responsibility to manage the nation's natural and cultural heritage, national parks need to be institutionalized. If large samples of the nation's major ecosystems are to be maintained in their natural state in perpetuity then an institution must be established to manage them for a very long time. Such an institution must look to staff training, park planning, and maintenance of facilities, interpretation and resource protection as activities which it shall have to implement forever.

Just as hospitals, water treatment plans and hydroelectric dams hopefully will be around for a long time, so should national parks be a part of land use and the socio-political and economic fabric of society for the very long future. To make commitments for such a long period means that decision-makers need to have the best possible knowledge before taking action. The institution charged with these types of long-run activities must be dynamic and be capable of learning and of growing in management capacity. These factors and others make it normal and imperative that parks be managed and operated by government departments.

There are many elements to consider for institutionalizing the capacity to manage national parks. Ten are among the most important and warrant attention:

1) Law and Policy on National Parks

National parks are generally established by law or decree from the legislature or the executive of national governments. The IUCN definition and criteria for national parks require that parks be established by law of the "highest competence authority of the nation." While executive or ministerial decrees are commonly used to establish national parks in Latin America, conceptually, they are fragile since another decree can abolish or otherwise alter the park. Exceptions do exist such as in Costa Rica where a new forestry law indicates that "once a national park has been established, no part of it shall be segregated for distinct objectives without the approval of the Legislative Assembly."[13]

The legislation concerning national parks and wildlife in Latin America was reviewed by Kropp in 1971.[14] The FAO report noted the variation among countries in terms of the strength and complexity of conservation laws. The report concluded that in general the laws were complete and strong: the weaknesses lie in their application on the ground.

Since that study there have been additional reports on park legislation of individual nations. The Amazonian countries initiated a comparison of their conservation legislation in 1976 in an effort to harmonize laws on park protection and the management of wildlife.[15]

Perhaps the most ambitious and exciting innovation in the legal aspects of park management has been the development of the "Environmental Code" in Colombia,[16] published in 1975. The Natural Resource Development Institute (INDERENA) received technical cooperation from the United Nations Development Program (UNDP) and FAO to prepare a code to integrate forest, fisheries, water, national parks and reserves, wildlife and soil, together with the many related aspects of public health, land use and pollution. Through the FAO Regional Project on Wildland Management and the FAO Legislation branch, a team of consultants worked with Colombian officers of INDERENA during several months spread over a period of two years. Drafts of the Environmental Code were examined and debated by members of the legislative, labor unions and trade groups, professionals in the environmental fields and the Office of the President of the Republic. The Code was signed by the President into law on December 18, 1974.[17]

In addition to the Code, documents were prepared by the team on suggested regulations for parks and wildlife, forestry and fisheries. Significantly, the team also presented documents on the "conceptual framework" for the Code and on the "alternatives for reorganization" to make the code effective.[18] Much of the creativity, breadth and depth of these documents is due to the enthusiasm and experience of Guillermo J. Cano who continues to work on the improvement of legal documents, structures and mechanisms for ecodevelopment throughout Latin America.

While laws and decrees for the protection and regulation of wildlife in Latin America have been in existence since the Inca, and for national parks since the late 1920's, the preparation and use of written policy documents is recent. Chile,[19] Colombia,[20] and Costa Rica[21] were among the first countries to prepare such documents designed to guide management decisions. In addition, these documents have been found useful to explain the role, function and management of parks to high-level government officers.

National park laws state objectives or purposes for the management of conservation areas, assign the role of custodianship to a new or existing government department, and establish conservation units. Very importantly, laws provide a mandate in the name of the people through their legal system. What is to be done, by whom, for whom, when, where and how, are covered in a general form of the body of the law. National park policies interpret the legal mandate and state it in terms of management. The policy transposes the law into the context of the moment and gives it harmony with other national priorities. It also outlines procedures by which the various activities of management are to be implemented.

The laws are enacted by the legislature of the nation; decrees are signed by the President or minister. They give mandates to the park department which, through the preparation of policy, interprets the law to guide its management decisions. Furthermore, the policy of the department is an implicit declaration of intent or what it should do and how it should be done to fulfill the conditions of the mandate.

It is significant in the cases of Chile, Colombia, and Costa Rica, that their policies were signed by the respective ministers or appropriate superiors. The signature means approval of the policy document. It also means that the mandate has been correctly interpreted and the declaration of intent has been accepted. The representatives of the owners and beneficiaries of parks have shaken hands with the representatives of the technical and professional managers of parks. This is not a mere symbolic step. It is the basis by which AUTHORITY is transferred democratically to park managers. Without a law and a signed policy the linkages of authority are discontinuous and probably weak.

Ideally, in addition to the organic law establishing the park department, the laws establishing the various conservation units, there will also be a written policy which has been signed by high government office. Over time, decrees should be superceded by laws. The authority of the park department should be perfectly clear.

2) Stature and Image

The capacity to manage national parks becomes institutionalized when the park department and the individual conservation units gain the STATURE of an important part of the government. This is greatly dependent upon the IMAGE[22] which is developed and cultivated over a period of years.

A park department is associated with what it has done and continues to do. An established park with neatly dressed and well-mannered rangers and clean recreation areas will leave one kind of impression upon park visitors. It will be quite another impression where visitors observe little-maintained facilities and rangers with dis-orderly appearance and inappropriate public contact. It can be expected that status will be gained by many different kinds of positive acts, for example, the strong defense of endangered species and the consistent application of laws. Alternatively, where privileged groups or individuals have special access to and use of parks or wildlife, the department can be considered to be arbitrary and have questionable loyalties. If the public image of the department and of parks is respectful, it can be expected that the status of parks will eventually reflect this value. Similarly, it can be expected that an eroding image can affect the status.

Unfortunately, it is not necessarily the facts which speak, but rather the perceptions or images of what appears to be the truth. Unless the public and other government offices are informed and aware of the policies, intentions and actions of the park department, the capacity of the department to manage will be challenged. Many cases can be imagined: For example, perhaps the government has exhorted the people to stop burning the forest and killing wild animals for many years; then, when the department initiates controlled burning or controlled hunting or culling in order to manage areas based upon ecological principles, the people are sure to be confused, unless they are well informed.

There are other aspects that are also related, many of which have already been discussed above in various sections. For example:

What does the department convey through its words and deeds as being important? Conserving the nations resources, or to grow and become a powerful bureaucracy?

Is the department associated with the important issues of the moment, or is it wrapped up in its own distant wilderness world?

Does the department appear professional or amateurish? Do its personnel appear serious? Does the entrance to the central offices give the impression that the department which is charged in perpetuity with the management of national treasure is working in there? Or, does it look like the outfit can barely pay its rent?

Is the department courageous on key issues, or is it passive and weak? Do its representatives speak out clearly and concisely as though they did their homework, or do they stammer and mumble? Is the outfit on the offensive or the defensive?

Are the employees of the department regarded with respect by officers from other departments? Is it a step up, or down, to move from another government department or private enterprise over to the park department? Is it the winning or the losing team?

Are officers of the department invited to advise or speak at government hearings, on the public media, at professional societies and clubs, and to rural groups? Does the departmental representative walk, sit and talk with the ministers? The President?

The ideal is perhaps when national parks are classified together with the other fundamental service departments of the national government and together with other symbols of the culture: hospitals, food production, water, libraries, historic monuments, churches and museums. When parks are so esteemed, they become an institution which may be around to manage national resources in perpetuity.

3) Procedures

The institutionalization process requires that the ways in which management is accomplished are formalized. This is important to ensure that practices can be repeated by other officers, that activities can be carried out by several places and expect similar results, and to economize on time and energy on "re-inventing the wheel." Structures and mechanisms are devised to permit and promote the smoothly running management of one park or of 50 parks at one time. There will be procedures for planning, hiring and training personnel, for obtaining permits to do research in parks, exchanging samples or data from the park, and many other activities.

Manuals will be written to standardize procedures on administration, scientific research, tourism and recreation, park protection, visitor-use regulations, and other areas. Unfortunately, just as standardization and formalization reduce variability in the way management activities are done, they also are capable of causing stagnation and obsolence by reducing innovation and imagination. Procedures can be followed because they are assumed to be "right" and habitual, not because they are appropriate or make any sense. Procedures must be established to economize time for making decisions on the ever-increasing list of problems coming to the attention of the directors. However, flexibility must be allowed in order to nurture and cultivate inventiveness on the part of personnel and to keep the department dynamic in a changing world.

By dealing with "conservation," "long-run," and "perpetuity" and the "preservation of natural resources," it is easy for the park department to become "conservative." The danger of "conservative conservation" is the alienation of parks from people. National parks will be around for a very short time after they cease to be relevant. Procedures must allow for park management to evolve with society. Also, parks must be able to influence social evolution.

Perhaps the ideal is where the department is involved with the important resource management issues of the day, is already working on those expected for tomorrow, and at the same time, the department is managing the natural and cultural heritage for the perpetual benefits of mankind. The negative impacts of man upon his environment can hopefully be reduced, and the positive impact of national parks upon humans and the human habitat increased.

4) Hierarchy

The park department must be placed at a level of hierarchy in the government appropriate to the responsibility and role expected from it. In most cases, the park department is an appendage of another entity which is second or third level within a ministry. Exceptions occur where parks are autonomous or are highly placed within the ministry or agriculture or the directorate of forestry or natural resources.

Several questions can be asked: Where does the department fit on an organizational diagram of the national government? Does this reflect importance? How does it relate to other government bodies in charge of natural resources? Is the hierarchy such that the directors are invited to participate in important discussions and investigations? Is the park director invited to meet with the minister, the cabinet or the president? Does he meet foreign guests?

The ideal hierarchy may have been achieved when the park department is identified specifically on the government organization diagram and has a place in the national development plan. Also, its several services will be shown in the development plan plan under other headings such as education, science and technology, water resources development, food and agriculture, environment, tourism and pollution control. It will be invited to participate on all natural resources issues and commissions on rural development. It will represent the government, or be on the government team at international conferences on national parks, conservation, science and technology, and environmental management of natural resources. And, the newspapers will occasionally show the directors meeting with ministers, senators, and the President on issues related to national welfare.

5) Lines of Communication

The institutionalization of national parks depends upon the establishment and use of lines of communication as discussed in detail under Organization above. The parks must be in communication with the regional and central offices and with each other. The entire program must be in communication with the public, the planning office and the related government and non-government organizations.

Basically, directives must be able to move from the department director to the district ranger and back again. Project proposals, guidelines, concepts and debate must move to other departments, the planning office and the public.

Have these lines been established? Do they work effectively?

National parks are becoming institutionalized when their direction, discussion, criticism and debate can flow as necessary and appropriate.

6) Career Development for Personnel

The capacity to manage national parks depends ultimately upon personnel. They must be trained and supported with supplies and equipment. If the parks are to be perpetual there must be continuity of park management. This is achieved in great part by insuring that personnel remain for long periods of time. They must also be able to grow in management capacity.

What is the rate of turn-over for personnel at the various levels of management? Do many stay for 20 or 30 years? Do they grow and advance during that time or remain in the same position and park? How many examples are there where lower-level officers have worked their way up the ladder to a director-level position? In some cases, field personnel are noted to remain on the job on the average of 9 months. At the other end of the spectrum, there are cases such as Itatiaia National Park in Brazil shown in Table VIII-8, where personnel have remained in service throughout their working lives, seldom transferring to other conservation units.

TABLE VIII-8

LENGTH OF SERVICE AND AGES OF PERSONNEL IN ITATIAIA NATIONAL PARK, BRAZIL

Length of Service, in Years	Number of Officers	Percent of Total
15-20	9	21.9
21-25	2	4.9
26-30	19	46.3
31-35	7	17.1
over 35	4	9.8
Age, in years		
30-39	7	17.1
40-49	7	17.1
50-59	19	46.3
60-69	8	19.5

Source: Personal Communication with Director, Itatiaia National Park, Brazil, February 17, 1977.

There are advantages and disadvantages to both extremes, but neither is the ideal. Officers without interest or vocation for park work can be steered by managers to other jobs easily in those cases where personnel tend to turnover quickly. At the other extreme, there lies the danger that officers with little promise may remain on the same position, or in the same park, for 20 years. On the positive side, personnel which serve for long periods in the same place offer continuity to the park. But on the negative side, they may lead to the stagnation of the park because they have had little opportunity to grow and develop themselves.

An ideal career development system provides incentives to officers to remain as employees of the park department by having access to training and opportunity to gain increasing responsibility, status, position and salary over time commensurate with their proven abilities. Those with little vocation are quickly identified and oriented to other job possibilities elsewhere. Personnel can advance within a park, or be transferred to other parks, and to and from the regional and national offices. If an individual is identified as capable of being a park director, yet is unable to be promoted in his own park because there is no opening, he can be transferred to another park where an opening exists. The career development system cultivates personnel: it develops and provides opportunities for the most capable to grow into leadership and decision-making positions. It develops spirit-d'corps, supports the individual and makes him capable of overcoming the many typical challenges to conservation and conservationists.

7) Learning from Past Experience

For a park department to attain the capacity to manage national parks for ecodevelopment, it must institutionalize mechanisms for learning from past experience. This is especially relevant in developing countries where park departments must attempt to gain managerial capacity with a modest budget and other means. It must also gain the capacity in a relatively short time since most departments have only recently been established or have become truly active. And, they face severe problems in trying to forge conservation into the development process at this time.

Some mechanisms for learning from past experiences include giving incentives to employees to make suggestions for improvement of those aspects of management for which they are held responsible. For example: periodic evaluation of management activities in terms of the objectives to be accomplished; self-evaluation by all employees; and, the evaluation of employees by superiors to ascertain their growth and development, and to determine the appropriate career steps to be followed.

A major problem is the traditional concept of "error" as a negative factor to be explained and reprimanded. For LEARNING to take place, all activities must be considered as EXPERIENCE, some having positive results and others negative. From either outcome, there is usually much to be learned if there is a context and a willingness to discuss the experience openly among employees. The line of reasoning can be: How could we have done that job better? What went wrong, and why? If that were to be done again, what guidelines can be offered to help others (or ourselves) do it better?

Learning can only be institutionalized when management and planning procedures are followed in a disciplined manner. Without DISCIPLINE, planning becomes a sporatic, haphazard and whimsical process. Some particular guidelines on learning and discipline can be considered:

a) Once a plan has been prepared for the management and development of a conservation area, a management program, a park system or a national strategy, there is a commitment to follow that plan. Naturally, flexibility must be maintained for changes introduced into the plan when warranted. The greatest danger is to substitute opportunism for flexibility. The first is an impulsive change in the plan, generally done without an analysis of the effect of the change upon the rest of the plan and the resources. The latter is a disciplined process by which a quick response can be made to new opportunities. Disciplined flexibility requires that the implication of making mid-program alterations in plans are examined and evaluated to assure that the benefits will not be outweighed by the costs.

b) In addition to the traditional short- [and long] run view of the management and development of an area, program, system or strategy, a long-run view must be maintained at the same time. When making decisions on planning and management, each detail must be viewed in a large-scale area and over a long period of time. Where will this action lead? What will it look like in 50 years? Each decision should be cross-checked as to its effect upon other present and future activities.

c) Planning and management are based upon following a logical and systematic ordering of questions, considerations and decisions. Order in decision-making must be maintained. Without order there can be little useful learning since the significance of results cannot be evaluated. There is a rather natural tendency to manage parks by jumping from one decision to another, depending upon the order in which people knock on the door. The urgencies of running the administrative aspects of an office can be separated from the planning and management aspects of parks.

d) Risks are to be given clear recognition. One of the major benefits from planning national parks and park systems is the reduction of risks. This is due to the systematic and orderly examination of the objectives and the means to reach those objectives. Whenever risks are left unrecognized or ignored, they are hidden and passed on to other days and perhaps for other managers to discover. Some few risks go away by themselves, but most seem to grow when neglected, often becoming harder to solve with each passing day. On the contrary, the open exploration of risks permits experience to be gathered which will permit decision-makers to more adequately handle the unknown and reduce "surprises."

e) The objectives must be maintained in clear view at all times. It is unfortunately common to find that the original purpose of national parks and plans have been forgotten. It is also common to find objectives becoming shortened and aggregated to such statements as "nature conservation," and "provision for public enjoyment," neither of which give much of a tool for measuring whether management is being successful.

f) Procedures for the modification, review and alteration of plans must be institutionalized. For example, it should be virtually impossible to make a new plan for an area or activity which has already been planned, unless there has been a strong case for wanting to consider additional alternatives or new information. Certainly, it must be possible for the department to respond to new circumstances. A disciplined procedure would begin with a review of the previous plan or decision, and the presentation of a strong defense as to why the former plan or decision should be re-made. It is possible to record decisions in minutes of meetings and in planning documents. Each suggested change can be put forward in consideration of past ideas and justifications, present arguments and views on the future.

Ideally, a park department will expand its management capacity and keep itself dynamic through a process of constant evaluation of work. By viewing each activity as an experience from which something can be learned (either positive or negative) a constructive attitude can be developed among personnel, stimulating them to search for improvements. Periodic evaluation of work activities as per the park plans, systems plans and national strategies, and periodic evaluation of personnel performance are tools to this end. However, all changes in past plans and decisions are considered in a disciplined manner to avoid disorder and discontinuity.

8) Planning for the Future

Management capacity is a fragile and unstable trait of a park department. Unless it is cultivated, fed with constant learning, and maintained in top shape through exercise in the real world, it will slip backwards and become obsolete.

A pragmatic and efficient means to cultivate, feed and maintain management capacity is to put it to the test of planning on a regular basis. By looking into the future and by preparing and updating plans, the department can be "exercised."

The experience gained from planning, implementing and the monitoring of results can be utilized to prepare "case histories" for seminars, courses and workshops. These cases can be developed into models for training purposes to "simulate" decision-making under realistic situations. Participants can ask: What would we do if......? What was done in the past? How can it be done better next time?

A relatively new and simple technique to develop management capacity is through GAME PLAYING where employees work with simplified models of real situations, and take roles as actors in those situations. The players are confronted by various real-world circumstances and problems. They make decisions, follow through the appropriate actions, and learn the consequences of their acts.

In the ideal case, a park department will develop and maintain its management capacity by regularly exercising its personnel in the tools for planning. Simulation and game playing are useful and pragmatic methods for making use of past experience to exercise decision-making capabilities on problems close to the real-world in which employees actually live.

9) Budget and Support

A park department has become institutionalized when it enjoys a budget which allows it to do an amount of work necessary to meet its terms of reference. Surely, the department could and would like to do more than an almost minimum level, but in a developing country perhaps the minimum is sufficient for today in light of other development priorities.

Are the key conservation units of the park system under an intensity of management which ensures that the objectives are going to be reached? Perhaps the more intensive investments in recreation, tourism or science facilities need to be delayed for the future, but today the resources must be safe from irreversible loss. The "minimum amount of work necessary to meet the terms of reference" is much more than a simple holding action. The basic level of work, for a park department which has become institutionalized, is that level necessary to produce the benefits from parks which are needed for ecodevelopment now.

In addition to financial budget, the park department must enjoy the political support of the government. Basically, it must feel free from threats of being reduced or abolished each fiscal year. It must feel at least as solid as the departments in charge of water management, electricity and highways. With increasing support given by the general population to the department, the objectives of park management can begin to appear realistically attainable. Parks are for people; true, but in a way which covers their heritage, science, education, re-creation, the development of rural areas and the maintenance and enhancement of the flow of water, genetics and other renewable natural resources.

Ideally, a park department will develop its management capacity to the extent where its contributions to national welfare are recognized. It enters that limited group of organizations which are considered to be basic to society. Budget then at least will cover the costs of managing the important wildlands which have been identified in the national strategy and systems plan. The government and the population will accept the need for a park department in principle and in practice, and the capacity to manage can be focused on critical issues.

10) National Parks -- A State Management Enterprise

Since the days of the "Yellowstone Manifesto" in 1872 it has been a basic tenet of national parks that they be managed by national governments. This belief is seldom questioned or challenged. With the exception of some research reserves managed by universities and scientific institutes, and those parks managed by state (provincial) and local levels of government, natural reserves in Latin America are managed by the national governments.

Even though few are ready to argue against government management of national parks, the implications and commitments for the government are seldom explicitly grasped. A governmental national park department faces many requirements. Among those already discussed are: to plan, manage and develop conservation units, to coordinate their management with overall regional and national development, to obtain sufficient budget and support to ensure adequate management, and to attain sufficient capacity to provide the necessary management. Several additional requirements should be mentioned.

a) All citizens are to be guaranteed access to the various benefits of national parks irregardless of their economic, social, racial, or religious or cultural characteristics.

b) The national park department must have access to those decision-making mechanisms which allocate land and natural resources and which coordinate the design and development of major public works (such as railroads, highways, power lines, dams, canals, colonization projects, etc.).

c) National parks form part of the nations "life support system" and require a moral and ethical commitment to ensure their management and longevity along with other elements of the nations major institutions.

d) The national park department requires authority to help cushion it, and the conservation units under its stewardship, from the constant push and pull of dynamic and unpredictable land-use pressures.

e) Most of the values coming from national park management are not marketed in traditional monetary terms. Parks need stability and extra-market status during the period while economic analysis for park values is being developed.

These requirements clearly point to the need for state management. Moreover they point to some strong commitments. Governments, on taking up the responsibility for national parks, are committed to place park management within the class of governmental priorities together with medical care, education, food production, public order and housing. Parks are neither above nor below these commonly accepted programs; parks are a thread in the cloth of each. Parks are in the air which all citizens breath, the water they drink, the food they eat, the concepts and ideas they learn and use daily; parks affect their physical and emotional health and their spirit.

These commitments require action. Parks need to be managed to meet objectives, and to yield outputs. This, then, is not only a government task but a government ENTERPRISE, a serious business.

A vicious circle? Perhaps the reader will argue that the government does not give park management the necessary status and budget to do the required job probably because the government does not value parks. But in reply, governments probably do not because parks are not considered to produce anything of critical importance. The parks do not produce critically important items probably because they are not managed to do so. To close the vicious circle, parks are not managed properly because they lack the status and the money!

Where to break in? The previous chapters have attempted to show the reader that many governments have passed the responsibility for wildland conservation to natural resource, forestry, park and wildlife departments to demonstrate what they can contribute to ecodevelopment. Presidents, meetings of ministers of agriculture, regional professional groups and United Nations agency resolutions, have all opened the door. Status and funds remain short and will stay that way for a long time. To break the vicious circle, the park departments can work to develop managerial capacity. They will have to do so with limited resources. They must utilize modern planning tools to spend limited resources as efficiently as possible and to place all efforts on track with national development.

The experience of several countries has demonstrated that as park departments develop the capacity to present their plans in written form to manage one, two or more parks, and to organize themselves to work towards specified objectives, they are invited to participate in the major environmental issues of the country. They become recognized by other departments and the planning board as a professional and serious office of the government. In many cases the response has been dramatic budgets have been increased, projects have been supported by the planning board, and status has been raised within the government hierarchy.

These first eight chapters have presented the core fundamentals to plan national parks for ecodevelopment in Latin America. The remaining four chapters place national parks and conservation into perspective with some developing countries in Africa, with problems common to Latin American countries in general, and with regional and global issues and programs for conservation and ecodevelopment.

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CHAPTER IX

SOME GUIDELINES FROM PARK MANAGEMENT EXPERIENCE IN AFRICA

Introduction

The national parks of Africa are world famous. In Latin America they are known primarily for the large animals and the views of tens of species and hundreds or thousands of individuals roaming the vast savannahs. For those who knew Africa first, and then visit Latin America, they may find the parks "void of animal life," but the vegetation is variable and interesting. To those knowing Latin America's park first, and then visit Africa, the animals are considered so outstanding that the vegetation is hardly noticed.

Naturally, there is over-simplification and exaggeration in such generalizations. Both continents have large numbers of plant and animal species. In fact, in the tropical zones they together possess well over half of the species of the entire planet.[1] Both also have extreme environments ranging from permanent snow and ice atop mountains and volcanoes, to sand covered deserts, tropical rain forests and ocean beaches, swamps, estuaries and coral reefs.

The Latin American park professional or enthusiast is interested in Africa's national parks for several reasons. There is the fauna; it is certainly different to think of managing elephants rather than guanaco. The Latin American park manager may have up to five species of cat in his park and hardly, if ever, see one individual; his African counterpart will see lions, cheetah, perhaps leopards and other cat species daily. There is the historical trajectory which has given African park officers a form of military discipline and the parks a strong legal authority. The large amount of tourism to national parks which contributes millions of dollars to foreign exchange leads to the strong support given to the park departments by central governments. The envy becomes logical when it is realized that there are more service vehicles in some individual parks in Africa, such as Serengeti and Nairobi, than in the entire park systems of Brazil, Chile or Colombia. The parks have planes, radios, brochures and maps, literature and a research staff.

In contrast, African park colleagues have barely heard that there are functioning national parks in Latin America. Those few who have attended the various world conferences and who have read the United Nations List of National Parks will be aware that something is going on there.

There is an impression that the two continents are extremely different and that there is little in common. And, it is assumed that Africa is far advanced in park management principles and practices.

During his work on national parks management and planning in Latin America, which began in 1962, the author became aware of these perceptions and they became his own. But curiosity remained strong. Surely there was much to learn in Africa. And, might there not be things for Africa to learn from Latin American experiences?

While preparing to write this book, the author made his first trip to Africa (south of the Sahara) with the purpose of comparing and contrasting park management with that found in Latin America. The itinerary was designed to visit parks selected to show conservation units in different biomes, government and political systems and levels of development. Parks were also selected to demonstrate particular types of experience. Parks and park related activities were visited in Botswana, Cameroun, Kenya, Republic of South Africa, Tanzania and Zaire.

The original intent was to gather data on the major characteristics of management in a manner systematically parallel to that already gathered in Latin America. It was soon apparent that data could not be collected uniformly. Terms and concepts were so variable. Area managers often did not possess the information sought. As in many countries, the central offices of each country presented the information on their parks in various manners and time was not available to order the data. Annual work plans and budgets were available, but not one park had a written "management plan" per se. This is changing with the cooperative activities of governments and FAO in Dahomey,[2] Cameroun,[3] and previously in Zambia.[4] Information was available about tourism. Considerable numbers of publications existed on the biology of particular species or management practices from a scientific point of view. In short, there was a great deal to be learned, but it would have to be done by observation and personal communication.

The personnel of each park, regional and national office were interested in discussing the parks in Latin America. They were extremely helpful and sympathetic to the questions asked by the author. Each time the author presented a slide talk on the park programs in Latin America entitled: "National Parks from Tierra del Fuego to Cuba," the reaction was generally one of enthusiasm and surprise. Through these discussions, an important difference between park management in Africa and Latin America became apparent:

a) In Latin America, considerable attention is given to discussing and designing (and more recently, in writing) the conceptual and strategic basis for park management. There is more of a tendency to deal in a larger scale and to look at the complexity of the overall problem.

b) In contrast, Africa is much more pragmatic and tactical. Far greater emphasis is given to the day-to-day operation of parks. There is concern for detail and much less mention is made about strategies, plans, principles, and concepts.

Perhaps because of this fundamental difference many of the author's questions about planning, regional development, cooperative efforts with rural peoples and other government agencies, planning offices, and the like, were apparently too abstract and they elicited little response. Yet, these are among the topics of greatest concern to Latin American managers. In contrast, when the questions would pass to the operational aspects of management, there would be a burst of facts and figures about protection, poacher control, fire management, tourism, concessions and hotels, visitor statistics and budget. In Latin America, it is the operations which are usually vague. Unlike their African counterparts, few Latin American park managers meet with their rangers each day to assign work details, to discuss problems and maintain close personal control of the park area. Few are aware in detail of their budget and the rationale for the number and location of each of their personnel.

It is difficult and dangerous to overgeneralize. There are many dramatic exceptions. There will be no attempt in this chapter to evaluate, rate, or rank the parks of one continent versus those of the other. This is because there are many aspects which cannot be studied objectively. For example, culture, colonial history, politics and rural sociology would have to be studied on both continents. It is difficult enough to learn facts and gain experience on one continent. To gain in-depth experience on two continents would be nearly impossible in one lifetime.

The objective of this chapter will be to present guidelines which can be usefully considered for application in Latin America. They are based upon the experience of park management in Africa. No attempt will be made to describe the national parks of Africa in detail since this has been done to considerable extent by K. Curry-Lindahl,[5] J.P. Harroy,[6] IUCN,[7] N. Myers,[8] A. de Vos,[9] and others.

Guidelines for Consideration from Africa

1) *An interdisciplinary team can prepare a management and development plan oriented to suggest solutions to key management problems of a park.* In the Amboseli National Park of Kenya, an ecologist, economist and sociologist along with the staff of the park, worked together to describe, analyze and prescribe solutions to the problems of tourism impact on wildlife and habitat, and the just solution to the use of land by the Maasai people.[10]

The Amboseli area is part of Maasailand on the north slope of Mt. Kilimanjaro along the southern border of Kenya. During the past three-quarters of a century it has been the site of conflict over land use between agriculturalists, settlers, and the Maasai, in part because of the abundance of fresh water during the dry season from a pleistocene lake. With the creation of the national park, the Maasai were again being pushed from traditional lands into dryer areas.

The present plans offered by Western and his colleagues, seek to permit overlapping of the livestock of the Maasai pastoralists and the large numbers of wildlife species. Much of the wildlife leave the park during the wet season and spread out across Maasai cattle ranch lands to the north. In the dry season, the wildlife return to the 388 sq. km. park. Traditionally, the cattle were also moved to the pleistocene lake in what is now the park. The plans call for the construction of an alternative water supply outside the park under the sponsorship of the Government of Kenya, the New York Zoological Society and the World Bank. In return, the Maasai will refrain from taking their cattle into the park.

When the wildlife spread across the Maasai cattle ranch lands, the plans call for compensation to the ranchers for each animal unit according to the period of time the individual animals occupied his land. Studies are underway to consider various uses of the wildlife while it is outside the park including hunting under appropriate technical control.

Furthermore, four other forms of compensation are being implemented: the 162 ha. area surrounding and including the tourist hotels in the park was retained as property of the Maasai Council in 1974 when the land became a park. The revenues from the tourism in that area go to the Maasai Council. Campsites are being located outside the park boundary on Maasai lands. The park headquarters will be moved outside the park or along the border in order to provide social services for both the park staff and the local Maasai cattle ranchers. And, new tourist lodges may be located directly upon the ranchers' lands and have access to the boundary of the park.

Another serious problem has been the negative impacts of vehicular tourist traffic upon the wildlife and the habitat. The plans seek to reduce these pressures and to increase the carrying capacity of the park to receive tourists. A new and expanded road system will be developed which provides more diversified viewing points and recognizes the behavior of the tourist based upon several years of research.[11]

A monitoring system is now being established to study the ecological and economic implications of the proposed management plans. It is expected that through step-by-step improvements it will be possible to arrive at an acceptable carrying capacity which provides for the long-term stability of the area, and sufficient income for local and national interests.

2) Medium-level training at regional schools can develop area-management personnel and give them practical experience. Regional schools help to develop similar criteria throughout a park system as non-government organizations. Over the years the courses have evolved to where at present there are three basic programs. The 2-year Certificate option is designed to train field rangers. Approximately 50% of the time is spent on field exercises at the school and in nearby national parks and reserves. The entry requirements for the course are 12 years of previous education including courses in biology and chemistry. Since 1965, some 382 certificate graduates have gone from Mweka back to their countries.

The 2-year Diploma option requires 14 years of previous education for entry. The course is more advanced than the Certificate, focusing on the training of supervisor and warden-level personnel. They receive more course work in planning, organization and policy. This option is separate from Certificate programs; it is designed for different individuals to be trained for different levels of responsibility. While one course does not prepare a student for the second course, there have been cases where exceptionally qualified individuals have taken the Certificate course and then have gone on to receive their Diploma in less than two additional years. Some 192 Diploma graduates have come from the College.

The third option is the cooperative program with any of the East African Universities to provide supervised field work on park and wildlife management and related research. Normally, graduate students come to Mweka for one additional year following their previous undergraduate work at the university. The program focuses upon wildlife management techniques.

All students are sponsored by their respective governments which pay the fees for tuition, room and board. The College is governed by a Council which includes representatives from the governments of Kenya, Tanzania and Uganda as well as two other African governments, and in addition, there are representatives of 6 international organizations normally including UNDP/FAO, Organization of African Unity, the East African Community, IUCN/WWF, the African Wildlife Leadership Foundation and UNEP. The professors of the College have been provided through the United Nations agencies, various bilateral agreements and the participating governments. Most recently, the Tanzanian government has increased its support of personnel and funds through the Ministry of Natural Resources.[12]

The Garoua School in Cameroun began its activities in 1970 under a project with the UNDP and FAO, in addition to cooperation from several bilateral government and non-government projects. Two courses are offered: Superior level for training wardens, and the Elementary level for training rangers or district officers. To enter the Superior course, 12 years of previous education are required. For the elementary, 9 years are required. The capacity of the school is 50 students at one time with approximately 17 to 21 in the Superior course, and 25 to 28 in the Elementary course. Beginning in 1977, the courses will change from one to two-years in duration.

The school is presided over by a board of governors including the Minister of Agriculture, and the ministries of Public Survey, Finance, Animal Husbandry, Tourism, Planning and Economic Development of Cameroun.

The school is developing its own biological area in Tcheboa for field training and research. Of the 150,000 ha, some 32,000 ha will be managed as a model national park; the remaining will serve for hunting and other field practices.

Following the 1976-77 school year, 26 students graduated from the Superior course, and 24 from the Elementary course. The students are sponsored by their respective governments and for most, scholarships are obtained from sources such as European Community, French and German bilateral aid, FAO and WWF.[13]

The officers trained at these two schools return to their home countries to former posts in the parks or are elevated to positions of higher responsibility in the park department. In Kenya there is an additional training option which is very significant. There is what might be called a "Management Apprenticeship" program whereby graduates of Mweka are assigned as assistant wardens under the tutelage of a senior warden with long field experience. The younger officer gradually picks up an increasing load of responsibility and expands his experience in decision-making and the operation of the park. Once he has gained the confidence of his superiors and there is a senior warden position open, he is transferred and given full directorship of a park unit.[14]

3) The capacity to manage conservation units can be greatly enhanced by close constant contact between the park manager and his staff and rangers on a day-to-day basis. A noticeable characteristic of African national parks is that the park manager lives and works inside the park. The park manager has an office in the headquarters area together with other staff members. Park offices are generally the scene of constant activity, a radio is chattering in the background carrying messages to and from the rangers in outlying areas, and vehicles, canoes or boats, and even small airplanes come and go with park personnel. Behind the manager's desk there are maps, charts and figures displayed on the walls. They present the park and its infrastructure, tourism statistics, facts about poacher control, ecological phenomena, and the like.

Aside from meetings with visiting scientists and specialized tourist groups, the manager spends most of his time dealing directly with his field personnel. He is generally a field man. In many cases it is difficult to locate the manager because he is joining field patrols, inspecting construction, talking with neighbors along the boundary, and training his staff.

Minimal time is spent in the regional or central offices. Periodic meetings take place there to present and discuss annual budgets or discuss new or proposed laws and policies. Most time is spent personally involved with park personnel in the park. The training received from one of the regional schools, from the apprenticeship-type of preparation and personal experience is shared and re-invested in the park in informal ways.

The parks in Africa demonstrate the benefits of rotation and of providing for the vertical mobility of officers. In Kenya, for example, the first local individuals to attain the post of park wardens started out as rangers in the parks. Their abilities were identified. Following several years of field work in the parks, they were given the opportunity by the department to attend the Mweka College. They did well and returned to positions in the apprenticeship system under senior wardens. Several years later they had worked themselves from Junior Assistant Warden, to Assistant Warden, to Warden. The new wardens may begin in those parks characterized by less difficult problems, and then having proven their managerial abilities, they are moved as the options arise to the more challenging parks.

The experience observed in Kenya and elsewhere in Africa merely reinforces the presentation in Chapter VIII on management capacity. Career development for park personnel is a major limiting factor for the future of conservation in Latin America.

5) The hierarchy of national parks can be organized to promote the active participation of field officers in planning and management. In Kruger National Park a management plan is now under preparation. The key lesson to be learned about planning from South African experience is the mechanism by which the plan is being prepared. As illustrated in Figure IX-1, there are three departments in the park: Nature Conservation; Tourism and Technical Services; and Administration and Finance. The Nature Conservation Department is divided into a Research and a Management Division. The plan is being prepared by research officers specializing in fire ecology, endangered species, tourism impact and other major local aspects of park management. The rangers of the Management Division are responsible for districts and sections of the park. They participate in the planning process by submitting field observations, by reviewing and commenting on proposals, and by working with research proposals on implementation of activities. And, the results of past management and development activities are constantly evaluated by the research and management personnel, together.

The participation of the ranger and research officer in the preparation of the park plan as well as of the regular annual programs for the park is exemplary. The support of the rangers in planning is actually stimulated.

At the National level, decisions are made by a Management Committee consisting of the three Departmental Directors, the Deputy Director and the Chief Director. Locally within the Kruger National Park, the organizational structure has evolved from the traditional leadership of a "warden" to the present sharing of management responsibility by the three directors of the mentioned departments. The chairmanship of the local management committee is rotated periodically among the three department directors. This works particularly well because the research and management personnel are now at the same level of hierarchy and salary scale.[15]

The approach to management employed in South Africa, and particularly in Kruger National Park requires that the ranger staff be educated, trained and have managerial capacity. It also requires that the park department have its own minimum staff of research officers. These are goals which require time to be achieved.

A specific example of how this organizational approach promoted the incorporation of the ranger staff and research staff in planning and management was noted in connection with the implementation of the fire

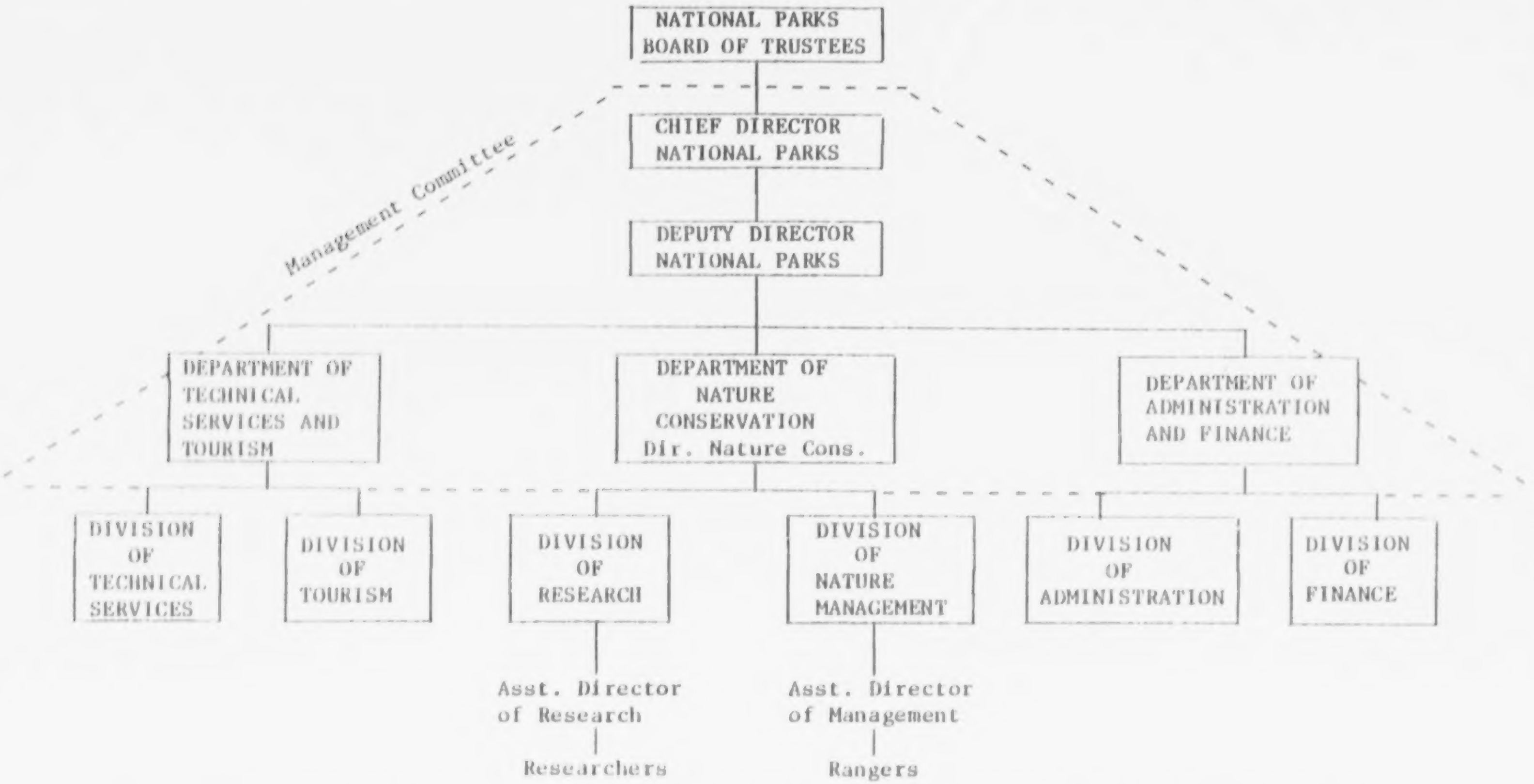
NATIONAL PARKS BOARD OF TRUSTEES
Management Committee
CHIEF DIRECTOR NATIONAL PARKS
DEPUTY DIRECTOR NATIONAL PARKS
DEPARTMENT OF TECHNICAL SERVICES AND TOURISM
DEPARTMENT OF NATURE CONSERVATION Dir. Nature Cons.
DEPARTMENT OF ADMINISTRATION AND FINANCE
DIVISION OF TECHNICAL SERVICES
DIVISION OF TOURISM
DIVISION OF RESEARCH
DIVISION OF NATURE MANAGEMENT
DIVISION OF ADMINISTRATION
DIVISION OF FINANCE
Asst. Director of Research
Researchers
Asst. Director of Management
Rangers

Figure IX-1. The hierarchy of national parks in the Republic of South Africa is organized to promote the active participation of field officers in planning and management.

Source: Personal Communication. Rocco Knobel, Chief Director, National Parks Board, Republic of South Africa, and other staff members in Pretoria and Kruger National Park, 30 August to 5 September 1975.

policy in Kruger Park. The "habitat management program" called for the planned burning of specific sectors of grassland during particular months of particular years. However, prior to actually setting fire to the sector, a district ranger and the research scientist examined the site to determine if field conditions confirm the advisability of the plan. Decisions may have called for a delay in burning until humidity conditions changed; in other cases, plant succession have changed from that anticipated several years ago when the plan was prepared, and now burning may or may not be appropriate. In either case, the ranger and the research scientist together must recommend the implementation or alteration of the plan. If they cannot agree, then senior officers are required to visit the site and make the decision. The significance should be obvious: the district ranger is held responsible for the area. He must logically be party to all decisions concerning that area or he cannot be held responsible for the outcome. Perhaps equally significant, this example from Kruger demonstrates the union of science and management where each affects the other. This is a major breakthrough in park management.[16]

6) The appropriate intensity of management depends on the objectives of individual national parks. There is a general tendency to insist that international criteria be applied to all national parks in the world in the same manner. The tendency is to judge the "means" by which parks are managed.

In Africa several cases can be observed where the "ends" are those of a national park which meets the IUCN definition and criteria, but the "means" are extremely variable. For example, in the Kruger National Park such species as elephant, greater kudu and the roan antelope tend to migrate in search of water and other habitat requirements during particular times of the year. Three sides of the huge 1,817,146 ha park are now bordered by agriculture and ranching. The fourth side is an international boundary. A considerable portion of these boundaries are fenced. Therefore, if the objective is to maintain these and other species, then measures must be taken in today's world to ensure that they remain inside the park boundaries. It has been considered necessary to install some 300 windmills and wells to provide water in traditional drinking places. These installations have tended to disperse the animals and prevent over-concentration and over-grazing around the few former permanent water holes.

Another example is the use of fire as a management tool. Also in Kruger, fire has been part of the ecosystem since the earliest of man and maybe as old as the grasslands themselves. To stop fire is to provoke a major shift in plant succession away from open grasslands or mixed grassland/shrub forest towards a relatively continuous low forest. Such a change will favor several species at the expense of many others which utilize the open areas, the small brush areas and the margins between the two for food, cover and reproduction. The management activity in Kruger is designed to carefully and systematically burn small controllable blocks of land in the park. Each year certain blocks are burned when weather and the conditions of the plants and animals permit. Records are kept to provide the basis for analysis and evaluation of each block from year to year to permit improvement in the technique. The fire must burn sufficiently hot to prevent bush encroachment, but not so hot as to destroy the scarce soil. The object is to promote neither an open grassland nor a forest, but various combinations of the two to maintain the diversity of the habitat.

In Latin America, there are also examples of intensive management where the measures are carefully oriented to the objectives of the individual park. Iguazu National Park in Argentina has a small area where up to 10,000 visitors per day walk around the great Iguazu falls on a complex system of catwalks. A few short kilometers away, there is the intangible zone consisting of about 80% of the 55,000 ha park. There, no one except those with special authorization for study purposes may enter. In the first case there is the commitment to recreation and tourism around one of the wonders of the world. In the second case there is the commitment to maintain a sample of the southern sub-tropical forest with all of its unique genetic materials (see map of the park in Figure II-12).

What these examples demonstrate is the need to reorient the logic common to national parks. Rather than asking, "What can be done in national parks?", the question more appropriately may be, "What must be done to assure that *this* park meets its objectives?" The difference between parks and other management categories is not so importantly that hunting or other activities are prohibited, but that there is a commitment to maintain an example of the biogeographic area in its natural state in perpetuity. It is for management to determine what is necessary to reach that objective. The measure of the "appropriateness" of management is whether the objectives are being, or have been, reached.

7) *Visitors to national parks are apparently willing to submit to vigorous controls when they are confident that the rewards from the visit will be high.* There is a general tendency to refrain from controlling the public in national parks in Latin America (and elsewhere). There is concern that if visitors are controlled they will not "enjoy" the visit and will not return. There are cultural aspects of this question which are important. At Kruger National Park, a carrying capacity for the park has been set at 2,500 guests at any one time. Several "camps" have been developed which provide cabins, restaurants, interpretative, picnic and camping facilities. Each camp is surrounded by a large, lion-proof fence. The facilities have been designed to collectively house up to 2,500 overnight guests. The largest single camp will house up to 750 guests.

Each potential visitor is encouraged to write or telephone headquarters and make a reservation for lodging in the park. He is assigned a camp and a particular cabin according to his wishes and the availability at that time. When the capacity limit is reached for particular days, no more reservations are accepted. This information is communicated to the park headquarters on a daily basis.

At the park entrance gate, the ranger asks each incoming visitor for the reservation receipt which has been mailed to the confirmed guest. With the receipt the guest is permitted to enter and proceed to the appropriate camp, check in, and then begin to drive about the park along the extensive roadways to enjoy the wildlife. Guests arriving without reservations will be allowed to enter and even to obtain accommodations if they are available. But, when guests with reservations fill the capacity of the camp, casual day-use visitors are not permitted to enter at the gates. They are directed to alternative motels along the highway outside of the park to await future openings.

This policy guideline is quite clear for Kruger National Park. The individual or family which plans its trip and makes a reservation has preference. Those who have planned their trip and are lodging in the park have preference to use the park during that period. How was the carrying capacity set? The regular factors were considered, such as impact upon wildlife and the capacity of the roads and camps. But, perhaps most interesting, the carrying capacity carries the policy that visitors warrant an experience as free as possible of crowding on the roads, trails and in the camps. The carrying capacity reflects that number which experience demonstrates to be tolerable to the guests, to the ranger staff and hopefully, to the wildlife.

One of the most elaborate examples of control on visitors in Latin America, is the Galapagos Islands National Park. Some 8,000 visitors come each year to visit the park by tour ship. The guests are met in the harbor in Guayaquil or at the Island of Baltra, and then carried on 5 or 10-day tours to each of several islands to see the wildlife. The guests sleep, eat and travel on the ships. To visit an island, the guests are carried in dingies from the ship to the shore where guides from the ship conduct the visitors on walks along established trails. The visitors do not eat during the walk, and each carries a "litter bag" to collect wrappers from his film rolls, etc.

Only certain islands of the park are open to visitation, and then only in specific zones and along defined trails. This has been clearly defined in the management plan[17] (see Figure V-9).

The challenge is to examine the examples of visitor control from experience of Kruger, the Galapagos and other areas, and consider similar measures for other sites in Latin America to raise the quality of the visitors' experience, and reduce their impact upon local management capacity and the natural or cultural resources.

Such highly controlled tourism would be important in Latin America in areas of fragile ecosystems such as marine bird and mammal sites, in inclement areas such as southern Patagonia, and in the tropical rain forest. In many areas, combinations could be made with strict lodging systems and guided walks or boat rides to specific attractions.

8) Given the opportunity, young people can become very interested and active in wildlife and national parks and take personal interest in their heritage. Developing countries are young countries in the sense that on the average nearly one half of the populations are around 15 years and under. The importance of developing values within young people for their natural and cultural heritage is well appreciated. The example cited in Chapter II of the work being done in Costa Rica at the

Poas Volcano National Park with school groups, and the work camp approach employed at Santa Rosa National Park with National Youth Movement volunteers, demonstrate this concern.

In Kenya, a program has been developed called "The Wildlife Clubs of Kenya" (WCK). The program began in 1969 with 12 member clubs from secondary schools and colleges. Most clubs are made up of urban children and young people. With the support of Kenya National Parks, World Wildlife Fund, African Wildlife Leadership Foundation, Unesco and other non-governmental organizations, the WCK holds seminars, tours to the national parks and conservation work projects. A biannual *Newsletter* is published by the WCK national office in Nairobi featuring club news and articles on wildlife generally contributed by club members.[18] A specialized publication on *Careers in Natural Resources*[19] was prepared by WCK in 1975 to inform young people about opportunities for work in national parks, wildlife management, museums, fisheries, forestry, tourism, agriculture, range management, mines and geology and water resources.[20]

A similar type of program may be interesting and useful in various countries in Latin America, especially where a large part of the population lives relatively isolated in rural areas or in small towns. The young people could be taken regularly to the nearest national park(s) and it could become part of the duties of the park staff to provide interpretative services and coordinate weekend camps for the groups.

9) *Tourism and recreation can be managed and developed to provide specialized services in limited sectors of parks. Some can be designed to favor international visitors, others for local recreationists, and some for both.* People are extremely interested in viewing African wildlife. It is difficult to design a method whereby people can see the large animals, be safe from them, and at the same time protect the animals from the negative effects of crowds of people, vehicles, and other intrusions. Among the methods of solving this problem which have been tried in Africa, the design and management of hotels is interesting. In Aberdare National Park, Kenya, two hotels have been installed within the park in a zone which is managed for the exclusive use of the hotels and four campsites leased to professional (non-hunting) safari companies. This zone has its own entrance gate on the boundary. Individual private cars are not permitted. The hotels and safari companies have official vehicles for carrying visitors on the narrow track roads within the park to their facilities.

The Treetops Hotel was built in 1932 with 22 beds. In 1978 it was expanded to 44 beds. The Ark Hotel was built in 1969 and has a capacity of 79 visitors. The Treetops receives approximately 20,000 guests per year while the Ark receives approximately 12,000. In general, about 50 percent come on pre-arranged tours, the remainder arriving on their own. In the case of the Ark, all guests arrive to the Aberdare Country Club just outside the park, where private vehicles are parked and from which the official jeeps or buses carry the visitor to the hotel. The normal tour arrives at the Aberdare Country Club by 12:45 and will be served a full lunch there. Then by 14:30 the group will be traveling on the official buses through the exclusive park entrance gate to the Ark. The visitors leave the buses and walk across an elevated platform into the hotel. The afternoon and evening are entirely free to view wildlife from the windows of the building. The entire exterior wall of the veranda area is glass or open. Each room has ample window space. In front of the building there is a large water hole to which animals come throughout the day and night. Large flood lights give an "artificial moon" effect making it possible to see the wildlife through the night. Electricity for the hotel and the floodlights come from a 14.000 watt underground cable. When rare species such as the bango (Boocerus euryceros) appear, the staff will ring the rooms and the guests can opt to get out of bed and rush to their windows to enjoy the rare delight.

All are awakened at 0645, luggage is picked up at the rooms, and at 0800 the guests are on their way back to the Country Club to join their tours or return to their private transportation.[21]

In return for the strict control, the visitor is given the opportunity to see and enjoy unique wildlife in very close approximation. The park serves thousands of visitors per year with a minimum impact. Only one park officer is occupied full-time by thousands of visitors per year -- the gate man. For all those visitors there is no need to occupy park personnel to patrol roads, collect garbage, control public order and be concerned about the safety of the people and the wildlife.

The one negative impact of the waterhole is that soil is actually consumed by the animals and carried away on their bodies. At the Treetops waterhole, it is calculated that some 500 English tons of soil per year are removed. Also, there is the problem that as the animals become accustomed to the hotel building and its introduced environmental elements, they begin to browse and graze around the waterhole. As their numbers increase, they actually "improve" the habitat by converting brush into grassland. As more animals come, to the pleasure of the visitors, the habitat is even more altered. At first, the alterations are favorable to the animals. But, eventually the point is reached where overgrazing occurs and additional utilization of the area can cause erosion and habitat destruction. Again, management activities are necessary to maintain a viable system.[22]

At the Safari Lodge, at Voi in Tsavo National Park, Kenya, an entrenchment has been built down from the front of the hotel to a concrete blind directly in front of the waterhole. The visitor can walk safely from the veranda of the hotel down through the walled stairway into the safety of the blind, and by remaining quiet the visitor can view and photograph elephant, buffalo, and other wildlife from 10 to 30 feet distance. Again, both the visitor and the animal remain safe and relatively unmolested. These examples of selected cabins, camps and hotels demonstrate that overnight facilities can be designed, built and operated in ecologically sound ways which provide human enjoyment and avoid molesting the wildlife.

Although there is no limited access to the exclusion of local citizens, these types of specialized facilities in Kenya and other East

African countries are oriented in great part to international tourism. The price of the hotel and the booking system definitely favor the foreign guest. However, there are examples in Kenya where facilities have been installed for all visitors.

In Nakuru National Park, Kenya, small walled walkways and blinds have been built to afford visitors a quiet hidden approach to the lake shore to view the flamingoes, white pelicans and other birdlife on this particular rift valley lake. A tree blind is especially notable. There, one can observe foreign and local visitors climb up and down the ladder to enjoy the higher perspective of the lake.[23]

The Ngorongoro Crater Conservation Area is not a national park but a multiple-use management program operated by the Maasai people. A former problem was that of individual private cars and tour company vehicles driving in an unsystematic manner within the crater to view wildlife. The vehicles caused considerable disturbance and erosion of the soils in the valley floor. To correct this problem, and to provide a greater economic benefit to Tanzanians, the government Game Division established the Tanzanian Wildlife Corporation. All visitors to the Crater now charter vehicles and driver/guides from this Corporation on a half-day or daily basis. In this way the number of vehicles and their management can be controlled.[25]

Park planning must analyze the kinds of facilities to be offered to international and local visitors, and ensure that both are given adequate access and opportunity to enjoy the resources in ways appropriate to each. Particular emphasis must be given to the cultural traits of the two or several groups: some activities require separation, others permit combination. And hotels within national parks are not always inconsistent. With careful discrete design, location and building material, they can offer a unique experience.

10) Specialized kinds of tours can be developed to give limited groups an intimate contact with nature, yet maintain flexibility in investments and keep negative impacts on nature to a minimum. Most visitors to Africa see the wildlife through the window of a Landrover or Volkswagon bus. They smell gasoline, breath dust and are surrounded by other human beings during their safari. This is probably sufficient contact with nature for most people. The protection of the metal walls of the vehicle are important to many.

A unique opportunity to visit a wildland area has been developed by ecologist Michael Rainy, Mrs. Rainy and several Samburu colleagues, called LOIKOP Environmental Experiences. LOIKOP features walking

into small breaks in the bamboo and insist that he remain there, silently. The rangers disappear. Moments later the visitor thrills to the chest-thumping and howling of approaching gorillas which may literally walk within ten feet of the visitor. With a cool head, and quick hand, the visitor may be able to photograph the animals before they depart. This is a rare opportunity and can be managed only in small groups by the park staff.

These methods have advantages. The installations are minimal. There are no buildings, paved roads or other fixed facilities. The tour can rotate trails and areas and minimize ecological impact on any given site. When demand is low there is no large investment to amortize. The personnel can be assigned to other activities. Mike Rainy, for example, rotates this work with research responsibilities, and his Samburu partners return periodically to their cattle.

Perhaps most significant to the developing country context, there is a greater utilization of manpower and a low use of capital. This fits with overall economic realities and promotes deeper human contact and the development of managerial capacity as the rangers and tour guides learn about recreation and tourism from first-hand experience. It does require, however, that the rangers and tour guides be trained in the ecology of the area to be able to explain the natural resources with some competence.

11) Research stations within the national parks can be operated to support management decisions. Generally, research facilities within national parks, where they exist, are utilized for studies on species, community ecology, animal physiology or plant succession as part of academic theses or projects. Some work is done on key elements of the park. Generally, little work is done as a planned effort to support management decisions. The tendency remains to define research in the terms of "pure" and "applied," a dichotomy which is of little usefulness or relevance to resource management. Every piece of knowledge has a piece before it, and one will always come after it. One can work upstream in the search for knowledge or downstream, but it is the same stream. In supporting park management decisions, it is necessary to know what each animal eats, to where it migrates, how it navigates and interrelates with plans and other animals. There are questions about tourist behavior, how tourists relate to animals, and vice versa. What are the best building materials for the given climate and soils? What is the optimum number of park rangers for the given park? These are all valid, important and significant questions and all require research. To divide them into pure and applied is irrelevant. What is relevant is to time the work so that the answers become available when decisions have to be made. Park objectives will be met to the extent that research supports the major decisions with facts, guidelines, principles and criteria.

The Serengeti Research Station in the Serengeti National Park of Tanzania was established in 1966 for the purpose of studying the problems connected with the long term conservation of the Serengeti and other national parks of Tanzania. Based upon the support of the Tanzanian government and donations from foundations, international organizations and government bilateral projects, the station has developed the capacity to do research including laboratory, housing, library, vehicles, equipment and other facilities. By 1968 there were 14 research staff officers. Through 1970 most work was carried out by individuals on individual plant or animal species as part of the policy to build up basic information and knowledge about the elements of the ecosystem. In that year, team work on problems of conservation and management of national parks was initiated.[26]

In 1969, work began on a monitoring project for the national park. Among the factors being measured and recorded are weather parameters, fire, animal movements and changes in vegetative cover. With the use of aerial photography and survey methods along with ground checks it has been determined that the elephant and other large animals have been reducing the forest and scrub vegetation along the northern area of the park. In some places the forest cover is being removed at a rate of 4 percent per year.

As fires and poaching decrease in response to more efficient ranger control, the number of animals increase. Each increase produces an expansion of the carrying capacity of the range as grass improves and woodland is reduced. There is a gradual loss of diversity. If there is a drought or an epidemic of rinderpest, there would predictably be a crash in the population of wildebeast and buffalo among other species.

From this monitoring project, practical guidelines are being suggested to management. One such recommendation has been for the culling of elephants in northern portions of the park. This appears especially relevant to scientists since elephants first immigrated to the park in 1958, apparently in response to changes in the surrounding land use. Their numbers reached 2,200 by 1966.[27]

The Virunga National Park celebrated its fiftieth anniversary in 1975 (established originally as Albert National Park). Among the many outstanding features of this park is the fact that research has been continuous during the entire time of its operation. It is apparently one of the most inventoried and studied national parks in Africa.

Several research stations exist. The installation of Lulimbi is currently involved in several projects: Bird banding is a major effort. Some 336 species and 33,847 individuals had been banded and recorded by mid-1975. A monitoring of the hippopotamus is carried out by lake boat, air, and from the land along the coast of the river and lake. Some 26,000 hippo are now present in the Rutshuru River and elsewhere in the park and there is growing concern over their increasing numbers. Parallel to the hippo monitoring there is a project to understand hippo mortality and aging.

It is the hope that these latter two studies will support management decisions on how to deal with the growing hippo population. Another project, parallel with that on bird banding, is the monitoring of the flamingos which arrived to the waters in Virunga only in 1974.[28]

In the Kruger National Park, the research by the park research officers is designed to respond to the questions of management. As an example of this, the national park staff wished to consider paving the highway which runs up the center of the park from the south to the north. In principle this would cut down on dust, erosion and noise. However, prior to implementing the pavement, the research staff carried out a project to study the impact of pavement versus other road surfaces upon wild animals. The results of the study supported the paving of the road, and provided guidelines as to the termination of the shoulders and the care of the vegetation along the road margins.

In Latin America there is a large potential for carrying out research to support park management. As was noted in Chapter II, most parks provide laboratory and dormitory facilities for researchers. In most cases, however, most of the research is not designed or utilized to support management. Exceptions occur in the research programs being realized in the Pampa Galeras National Vicuna Reserve and the Manu National Park of Peru.

Perhaps the most outstanding example of a research program designed and implemented to support park management is that initiated by the Charles Darwin Foundation for the Galapagos Isles. It was founded under the auspices of Unesco and the IUCN in 1959 to be devoted to the conservation and study of the natural history of the Galapagos. The Government of Ecuador initiated conservation activities on the archipelago during the same period and invited the Foundation to establish a permanent field station in the Islands. The Charles Darwin Research Station was inaugurated in 1964. Early research efforts concentrated on surveys of endangered species and the establishment of the Station. It was a period of data collection and the design of conservation projects. Many scientific missions utilized the Station, financed by their home institutions. By 1968, effort were focused on specific conservation measures such as the rearing of tortoises (*Geochelone elephantopus*) and educational programs for Island teachers. Following that period, measures become even more practical, particularly designed to support the establishment of the Galapagos Islands National Park.

During the period 1968 through 1974, activities included tortoise rearing programs, the control and extermination of introduced animals, tourist management programs, environmental education, research on endangered species and habitats. For example, during one project made up of research and management personnel, over 40,000 feral goats were eradicated (exterminated on three islands and severely reduced on three others). Over 500 young tortoises of the six most endangered sub-species have been hatched, raised and are being returned to their native islands. Nature trails have been installed to guide visitors through selected sites of interest where ecologically acceptable. Ecuadorian staff-members of the Station are teaching natural history and conservation in the primary and secondary schools of the Islands, and a training course is given for teachers and government authorities, annually.[29]

12) *Solutions to the conflicts with local native peoples require intensive, often medium and long-term study on the area.* A problem becoming more common in both Africa and Latin America is the relationship between the claims and just rights of native peoples on the one hand, and the needs of the nation to establish national parks and other categories of wildland management units, on the other.

The contribution to this type of problem in the Amboseli area of Kenya by D. Western and his collaborators has already been mentioned previously in the first guideline of this chapter. The study involved working with the Maasai, the vegetation, the Maasai grazing stock, the wildlife and tourism. The land rights of the Maasai people were carefully analyzed as well as their employment of the natural resources.

The plan proposed by the research team following several years of careful study suggest that a new water line be built to transport water from the lake of the park to an area outside of the park where the Maasai can water their cattle. In exchange, the Maasai would refrain from bringing their cattle into the park for watering.[30]

Other very complex dimensions of the problem continue to be worked out. The FAO wildlife project worked on the Kajaido District and proposed alternatives for compensating Maasai for the loss of grazing resources to wildlife, and for their sharing in revenues from hunting animals which pass part of the year in the park and part on their grazing lands.[31]

While similar views have been developing in Latin America, most such efforts have not included long-term research studies focused to answer managerial questions. The main exception is with the Pampa Galeras National Vicuña Reserve where continuous research since 1965 has provided the foundation for the planning and implementation of the National Vicuña Program. The vicuña is added to the traditional methods of land use in the Andean highlands over 3,500 meters above sea level. There will be shearing and the production of meat and hides on a sustained-yield basis. And, small cottage industry will be established with government support to provide the Indian communities additional opportunities for employment.[32]

13) Guide services can be developed and institutionalized to provide both information and safety to visitors. In general there is very little attention given in Latin American national parks to guiding visitors and to ensuring their safety. Most rangers function in the role of police. There are exceptions such as in the Galapagos where courses have been given by the national park, the Darwin Station and FAO to train guides for the tour ships. In Patagonian Argentina, particularly in the Province of Chubut, courses have been given for guides working with tour companies. There are also exceptional cases where individual rangers have taken it upon themselves to read and study, and provide guide services to tourists. Concerns for safety have seldom passed beyond preliminary first aid with the exception of the training efforts of C.W. Wendt in Argentina, Chile, and Costa Rica in search and rescue, mountain rescue, orientation and related techniques.[33]

In Mt. Kenya National Park, Kenya, a fully equipped mountain rescue team has been developed to cope with the dangers involved in climbing the 5,194 meter peak. First aid training is particularly involved because of the altitude and various dangers related to mountaineering under local conditions. Procedures have been worked out where the climbers sign-in at different points on the journey, and then if they do not return within 24 hours of the time of their estimated return, the rescue is initiated.

All guides and porters which are allowed to even enter the gate with visitors must be licensed. They have been trained and are held responsible for the safety and activities of the visitors at the risk of losing their licenses. They are also expected by the park to enforce laws and to pack out wastes.[34]

Similar formal procedures and training could be very useful in parks throughout Latin America, especially where groups hike and climb into remote areas. However, the principle holds for all parks. Guides could be formally licensed and trained to conduct tourists through any park, to enforce the law indirectly and ensure the safety of the visitor. The guide can take the role of the regular interpreter by receiving sufficient training to be able to offer an accurate and informative tour. These individuals would not have to be employees of the park, but work on the basis of fees charged for the tours which they guide.

14) National parks, reserves and other categories can work together under unified management to provide for conservation and development. Park specialists have long advocated that national parks must be planned as elements of regional development. They have also advocated that parks should be bordered by other categories of natural resource management to buffer the parks. These concepts receive virtually universal acceptance at international meetings, yet they have hardly been tried.

In Africa several cases can be mentioned where national parks are bounded by other wildland categories. In Botswana, the northern border of the nation is managed under a spectrum of wildland categories ranging from Chobe National Park on the northeast, through hunting reserves, to Moremi Reserve and on into the Okavango Swamp in the northwest. The Chobe and the hunting reserves are administered by the Department of Wildlife and National Parks of the Ministry of Commerce and Industry. The Moremi Reserve is under the Ngamiland Fauna Preservation Society which runs the area on behalf of the local tribe. The Okavango Swamp is in great part under tribal control. While the Wildlife Department does not have control in Moremi nor on the Okavango, nor does it administer wildlife laws to tribesmen hunting on tribal lands, there is a consciousness in the Department and in various Ministries and levels of government that the rational use of these wildland resources does require a mixture of uses including parks and reserves to provide for the conservation of heritage, the management of tribal resources for multi-purposes, and as a stimulus for rural development, probably based upon tourism. Studies to this end are extensive.[35]

The Maasai Mara Game Reserve of Kenya borders along the northern boundary of Tanzania's Serengeti National Park. The Ngorongoro Conservation Unit borders on the eastern edge of the Serengeti and between them the Olduvai Gorge monument is nested under the management of the Ministry of National Culture, Department of Antiquities.

The eastern edge of the Tsavo East National Park is buffered by hunting reserves managed by the Game Department.

Other cases exist in Africa. Some few cases exist in Latin America. The Iguazu National Park of Argentina shares its western boundary with the Iguazu National Reserve, and its northern boundary with the Iguacu National Park of Brazil. The Manu National Park of Peru has the Manu National Forest along one boundary. The Chirripo National Park of Costa Rica is flanked by the Talamanca Forest Reserve. Various national parks of patagonian Argentina and Chile share boundaries with other parks and reserves to make up extensive blocks of managed wildlands.

The challenge is to take the concept and make it into policy, to use it as a guideline when planning new parks and reserves and when re-aligning existing units. Not only can management be more harmonious, but significant economies of scale can be found especially where the same government department is in charge of the various categories.

15) Marine parks can be open to the public and utilized for recreation if they can be well controlled by park personnel. The marine parks of Latin America are for the most part either kept closed to general public recreation, or little developed for that purpose. These are open to scientific research. This is rational in areas where neither scientific information nor management capacity are available as yet.

The experience of the marine parks of Kenya suggests that visitors can be allowed to swim and snorkel along coral reefs and appreciate marine life. However, the Malindi and Watamu Marine National Parks and the Malindi Marine Reserve have been designed such that visitors must pass through the entrance gates. They are offered the option to walk and swim along the beach or provided with a tour in a small boat with a glass bottom. From the boat the guest can appreciate the coral reefs and marine life through the glass bottom, or can snorkel with equipment furnished by the boat driver.

The boat operators are private owners of their craft and have been trained as guides and in the regulations of the park. They are licensed and pay a fee each year for the right to operate within the parks. They are held responsible for the behavior of the tourists and for supporting the park in implementing the regulations. For example, guests are not allowed to remove coral or other materials from the park. Litter is strictly controlled.

The boats must tie-up to buoys which have been attached to permanent anchors. This prevents destruction of coral from the lowering of the anchors of each boat during each tour.

At a nearby resort, SCUPA-diving guides are available to take guests (who must be certified SCUBA divers) on more intensive tours under water. These guides are also licensed to work within the parks. These individuals generally have diversified activities around the periphery of the parks including hotel management, deep sea fishing, and tourism logistics.

The Kenya Marine Parks have trained a specialized group of rangers to work in this environment with specialized equipment. safety requirements, interpretation and problems.

The marine parks in Latin America and in the Caribbean can learn from the valuable experience in Kenya. The three connected units are managed under one warden. He has an assistant warden, a junior assistant warden, 2 park assistants, 2 corporal-level rangers, and 25 rangers. Then there are 4 coxmen to pilot the park patrol boats, 4 carpenters, 3 laborers, an office messenger and a driver.

The rangers work in three shifts. They are assigned to patrol the two national parks in a manner so as to afford maximum control of the more than 35,000 visitors per year coming to the areas. The park coxmen carry rangers on patrol in the sea. These boatmen are trained and graded by the Harbor Corps.

The Malindi National Reserve envelopes the two parks and covers 82-1/2 square miles (approximately 9867 ha) running from 100 feet above high water-line to the 3-mile territorial limit out in the Indian Ocean. The two parks have a total area of 7-1/2 square miles (approximately 897 ha). The intensity of management in the two parks can be appreciated by considering the ratio of rangers to area.[36]

This experience suggests that even while the marine parks are large, covering diverse environments, perhaps only small sectors should be opened to visitation such that intensive protection can be provided to a limited area.

Following further interchange between Latin America and Africa, and hopefully with Asia and the Pacific, it should be possible to draw further and more substantive guidelines from experience in other developing countries. There is little doubt in the mind of the author that Latin America has many valuable guidelines to suggest to other countries. Many suggestions can be deduced from the materials covered in the previous chapters. The interested park manager is urged to come to Latin America to see for himself and draw his own conclusions from the experience which Latin America colleagues will enthusiastically share.

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CHAPTER X

MAJOR PROBLEMS FACING NATIONAL PARK MANAGEMENT IN LATIN AMERICA

Introduction

On raising the question, "What are the problems faced by the national park departments in Latin America?" one can anticipate a long and complex response. There are some problems common to all departments and there are others peculiar to each. Wetterberg discussed park management problems with officials from South America through a systematic series of interviews during 1972.[1] Other expressions of problems have been put forth at various meetings of the CLAPN, FAO, IUCN, UNEP, UNESCO and others.

Recently a document was prepared by the Brazilian Institute for Forestry Development (IBDF) on the current state of national parks and equivalent reserves in South America as background material for its 1977 course on national park management and administration.[2] According to that study, ten problems were identified by park officials in their responses to a questionnaire:

a) Lack of qualified personnel (cited by 9 countries);

b) Lack of legal status for lands within the national parks (cited by 5 countries);

c) Lack of government and public ecological awareness (cited by 5 countries);

d) Lack of adequate legislation for national parks and conservation (cited by 2 countries);

e) Lack of an inventory of potential areas to be included in the national park system (cited by 2 countries);

f) Insufficient on-site protection in the national parks (cited by 2 countries);

g) Growing numbers of visitors with objectives in conflict with park management (cited by 1 country);

h) Difficulty in elaborating and implementing park interpretative plans (cited by 1 country); and

i) Insufficient physical infrastructure in the national parks (cited by 1 country).

In addition, all respondents commented upon their concern for the general lack of financial support for the management and development of national parks.

In the perspective of a park manager charged with implementing park programs, these are indeed some of the real day-to-day problems which are faced. These problems have several common threads related to qualified personnel, sufficient financial support, public support and inter-departmental coordination and cooperation. As noted in Chapter VIII, all of these are in turn based upon one central issue -- the creation, maintenance and enhancement of the capacity to manage national parks.

Rather than attempt to discuss specific field problems, the solutions to which are normally peculiar to each situation, this chapter will attempt to examine some of the roots of the problems facing park management in Latin America. Ten specific "problems" will be posed to help place the issues into context and to orient the reader towards viable solutions. It is common to consider some problems as "causes" when they may in fact be "effects," and dilemmas like "the chicken and the egg." By placing key problems into perspective, more attention can be given to underlying issues which require solution before the more superficial symptoms can be cured.

Ten Major Problems

1) Rapid Development of Managerial Capacity. Virtually every park department in Latin America has far more work than it can possibly handle. Most departments have been given considerable responsibility by government, including the recent mandates cited in the last section of Chapter II.

The challenge to the departments is to lift the capacity of the personnel to the level of the task, and this must be done as quickly as possible because the interest and the mandate are currently there, and the job needs doing in the best interest of the nation.

It is suggested that park departments begin with park planning and management workshops to acquaint all personnel with concepts, terms and alternatives for action, to create a common bond among personnel, and to set the stage for planning national park units and the park system.

As part of the training program through workshops, field exercises should include the planning of actual national parks, utilizing methods such as those suggested in Chapter V. The concepts and methods for planning systems of national parks, such as that presented in Chapter VI should be presented.

The workshops need not require more than two or three weeks each and should involve no more than 15 or 20 officers at each session. A park planning exercise can be held in 3-4 days depending upon logistics and scale of the area. Once a planning team is clear on its job, a conceptual-level plan for a park can be prepared in 3-4 weeks.

Naturally, plans will take years to mature, but the challenge is to write a first draft. In so doing, the personnel will learn to identify the questions and problems peculiar to each area, and to focus their efforts upon the real issues concerning the management and development of the park. They can then select priorities for action and prepare a schedule of work which will include the research necessary to support management decisions.

When the personnel grasp how the jig-saw puzzle of a national park fits together (by virtue of having taken it apart), a workshop should be held on planning the system of parks for the nation, utilizing methods such as that recommended in Chapter VI. Again, an exercise can be held during several days to prepare criteria, gather basic information, examine and evaluate existing parks, and consider new areas to fill the gaps.

The same workshop on system planning can present the concepts of strategy planning. By following methods such as those suggested in Chapter VII, the draft systems plan can be expanded to consider the limitations of resources, the relative urgency of each project, and the priorities for action at the national level. Most important, the participants can learn to understand "strategic thinking."

By preparing and implementing the workshops and team planning exercises, it will become apparent which associate fields (botany, geology, engineering, archeology, etc.) are unavailable. The department will have to promote the strengthening of these fields at the local universities, or establish ties with other organizations where such fields are available.

By designing the manpower requirements for individual parks and the entire park system for the years to come, the various options for training can be considered. Seminars, formal university courses, international programs and study tours are all possibilities. Perhaps the department will consider it appropriate to help promote and support a regional training school, or adopt an apprenticeship program (from the Kenya example in chapter IX).

The isolation among park officers around Latin America is an outstanding factor in forcing them to try what appear to be new ideas which may have been tested by colleagues elsewhere. The long-advocated periodical journal for park managers was initiated in 1976 called PARKS, under the cooperative support of the U.S. National Park Service, Parks Canada, UNESCO, OAS and IUCN. It is published quarterly in Spanish, French and English and is sent to all park departments, related university departments, and interested institutions and individuals. Thus far this is the only international journal for park managers capable of reaching a world-wide audience, and of use to all levels of hierarchy within the organizations. Park managers can prepare articles for the journal (in Spanish, French or English), can send comments and criticism to the editor, and can help shape the journal to become more relevant and useful.

Most of these suggestions could be implemented immediately in any country of Latin America. It is advocated that within a 24-month period, any country could have personnel involved in planning, several park plans available for circulation, a draft system plan, and a draft national strategy. The department could be involved with training activities, in touch with other colleagues around the world through PARKS. This is not an unreasonable or complex endeavor.

To start this process it may be necessary to request the cooperation, for a period of several weeks or months, of individuals trained in park planning and management. As will be described in Chapter XI, this can be done through IUCN, FAO, UNESCO, and UNEP. Often, colleagues just across the border can provide all of the help necessary in "getting the ball rolling." However, no time should be wasted in gearing up for a major project with outside technical assistance and the like. One well trained and experienced individual can act as the team leader or catalyst to guide the first workshops and training exercises.

2) Development of a Systems Perspective. Most park departments have been viewing so closely the destruction of natural resources, species extinction, and the salvaging of remaining wild places, that little time has been left to develop the capacity to analyze resource systems.

Specifically, all resources must be examined in terms of systems. Where does the water come from, and where is it going? Who is doing what upstream, downstream? What can affect this site, and what in this site can affect the area downstream? This holds obviously for watersheds, and it also holds for forests, estuaries, coral reefs, ocean currents and other habitats and ecosystems.

The places where energy flows (water, nutrients, etc.) and the sites where critical natural activities take place (nesting, breeding, etc.) require specific attention. Where do things happen? The nesting sites for birds, calving sites for whales, upstream catchments, fish spawning sites, bird flyways, animal migration routes, natural water springs all are critical points on the map.

A park manager should always think in terms of "Where did it come from, what does it do here, and where is it going?" What depends upon what? Plainly, this is ecology: The park manager needs to be an applied ecologist.

Pragmatically, the systems perspective provides the framework within which the park professional can make a major contribution to land use planning. Park management is the field which must specialize in studying, identifying, selecting and caring for the critical areas for natural energy flow and natural activity which keep the biosphere operating.

3) Development of Methods for the Management of Wildlands which can deal with both Conservation Objectives and Direct Human Use. The land around most established national parks is already in direct human

uses such as agriculture, forest and fisheries, in their intensive or extensive forms. In the extreme cases, parks are either bounded by rice fields and exotic tree plantations on the one hand, or by the almost wild lands utilized by Indian forest dwellers for traditional forms of hunting and fishing, on the other.

Where the surrounding land use is not capable of buffering adverse external activities, the long-run survival of national parks for their ecological values is insecure. As discussed throughout the above chapters, parks are a special form of land management for maintaining and enhancing the human environment. To accomplish this goal, large tracts of land need to remain in a natural form.

It is becoming clear, moreover, that parks alone cannot possibly maintain species and their habitats. Parks will protect some of them, hopefully, the most important and in the form of ecosystems. But, plants and animals fly, crawl, walk, run, or swim. Pollen moves for hundreds of kilometers. Birds responsible for the seeding of important timber trees cover a large territory. Marine species may spend parts of their life cycle in estuaries, marshes, coral reefs, or in the open ocean. Obviously, something must be done to maintain species, habitats, diversity, and environmental regulation elsewhere, outside the national parks.

In many of Latin America's wild and semi-wild lands, so-called "primitive" cultures can be found which have adapted technologies for utilizing rainforests, coastal lands and the sea during ten and more millenia. They have learned to work with the ecosystem, that is, their technologies are applied to the environment in ways which do not destroy or disrupt natural processes. Other peoples in these areas originated from European immigration and in some cases are involved in colonization with simple technologies.

Reserves can be established which provide for the continuation of these cultures and low-technology (low consumption) ways of life. And, at the same time, through zoning and careful control, such reserves can be managed for several conservation objectives including the maintenance of the species habitats, genetic materials, ecological diversity and environmental regulation. Such reserves can be established around the national parks or can be placed occasionally in lieu of parks where the combination of conservation and simple technologies will provide appropriate environmental management.

Caution is warranted not to fall into the trap of an overly naive rationale for native peoples. Several alternatives have been studied by Ehrlich and the Peruvian Forest and Wildlife Directorate.[1] These studies advocate that under specific conditions, such as the cases of the Pampa Galeras National Vicuna Reserve and the Paracas National Reserve, peoples adapted to high altitudes and desert coastal environments, respectively, have technologies for survival which are in minimal conflict with nature conservation. Furthermore, it is argued that only with their participation and intervention will the wildlife and wildlife habitat be maintained.

The programs of the national reserves in Peru are worthy of study and consideration for adaptation and application in other countries where rural native peoples maintain traditional ways of utilizing natural resources.

4) Development of a Range of Categories for Management of Wildlands. Agriculture, silviculture and mariculture are technologies for combining inputs to produce outputs related to particular goals: to feed people, to build homes and schools, to make paper, etc. There is a missing class in this traditional breakdown which typifies the plight of park management. Where is the technology for combining inputs to produce outputs related to ecosystem conservation, genetics, water resources, recreation, research on natural systems, etc.? Variably this is called forestry, nature management or wildland management. These terms are not synonomous, but they are close. A common distortion, however, has come from equating silviculture with forestry, trees with the forest, wood with foresters!

What is required is a range of categories of wild land use. The national park category offers one basic technology which has certain capabilities. It can do only certain things. As shown in Chapter I, there are other technologies capable of concentrating or combining other inputs and outputs. Want wood, wild protein, to protect a bird nesting site, protect a river catchment, protect a dam site, provide intensive recreation in an outdoor environment? There are ways of doing any of these things on wild land.

Most of the categories which are designed in Chapter I, are in use in one country or another. Some countries, notably Chile, Colombia, Costa Rica, Ecuador, Mexico and Peru have designed and are implementing categories in addition to the national park. As presented in Chapter VI, Brazil, Colombia, Costa Rica, Cuba, Ecuador and Peru each have some form of written conceptual framework and suggested policy for developing and managing a range of wildland categories. The increasing use of categories by the nations of South America in relation to conservation objectives has been analyzed, by Wetterberg, et al., in 1977.[4]

The challenge is to design the categories required to provide for the products and services needed by the nation. Then, similar to the methods suggested for planning national parks above, areas can be selected, managed and developed to fulfill particular functions in the conservation and development of the country. And, with a clear systems perspective, the various categories can be related to one another to form large blocks of wildland, managed variously for particular purposes. A national park may lie in the center, surrounded by national forests, wildlife sanctuaries, water protection zones, recreation areas or national reserves.

These new categories will require laws, policies and managerial capacity in parallel form to national parks. Much can be learned from national parks to help establish and manage other categories. One such lesson is that effective area management requires that officers live in the conservation unit. Most categories other than national parks are to be found on maps only. The resources in these "reserves" are liquidated and disappear regardless of laws and intentions. The major exceptions to this generalization are the natural monuments in Argentina, Costa Rica, Colombia and Venezuela, the national forests and reserves of Peru, and the forest reserves of Chile.

5) Development of Government Support. The support of the government means many things. It means budgeting annual funds to pay salaries, maintain installed facilities and operate the national parks and the necessary offices. It also means sufficient funds for the development of new facilities and new parks. It means support to establish new positions as necessary to place newly hired officers in the department as new parks are established and as the capacity to manage must grow. Support means the ability to pass new laws and policies to keep the department modern and up to the moment. There should be participation of the department in issues and decisions on natural resources. The department should be able to obtain lands through the normal legal process for new or expanded parks, to import special supplies and equipment if they are not available locally, to obtain scholarships for officers to earn advanced degrees to take special courses, and for officers of the department to attend key international meetings on conservation.

However, "the proof of the pudding is in the eating." The department must be able to demonstrate its usefulness to the nation, its capacity to manage, and the advantage of support to its activities relative to other demands upon the national budget.

In the realities of developing countries, this means simply that park departments must be able to start with that which is available at the present moment and prove its worth. Support, in other words, must be earned. It is not self-evident or automatic. The often quoted outstanding support of the government of Kenya for its parks departments comes in great part because the country earns some \$67 million dollars of foreign exchange annually due to its spectacular national parks. The support of Venezuela comes because, among other things, that park department is associated with the water supply of Caracas, and the electricity for the nations industry and capital city. In Costa Rica, it is for the recognized management of the nation's natural and cultural heritage. In Peru, it is in part because the vicuña program has been a significant success, and because the national resources appear to be managed competently.

Support is evident where the park department has had the courage to take a leadership position, a professional non-partisan position, and to tie in with major development issues.

Support comes to the institution which has shown its competence. Yet, competence comes because support is forthcoming. A vicious circle? Yes, and the circle can be broken by starting from the present, by planning, making a realistic strategy, by understanding resource systems, by training staff, and by learning quickly from past experience. Support appears to have come to park departments which have stepped forward, however poor their budget, without an inferiority complex about other local government departments, or what is done in other nations.

6) Development of Scientific and Technical Support for Decision-Making. There are a series of problems which require scientific and technical support. They include: the determination of the appropriate size and shape of parks and reserves; determination of criteria for the selection of the various types of parks and reserves; identification of the habitat requirements for the major species in parks and reserves and elsewhere in the country; design of the techniques for appropriate manipulation of the habitats as necessary; determination of the potential mixes of output from different types of parks and reserves; determination of the gaps in the national park system; and, understanding of the indicators from the feedback of management practices being applied.

The answers to these and similar questions require that a strategy on investigation (including research, information gathering, inventory, survey and monitoring) be designed. Which questions are most urgent? Which ones warrant expenditures from the scarce budget of the department? In what order should the questions be asked?

There are many options for research. Universities generally have departments of biology, forestry, geology, sociology and education. Small incentives can be offered to university professors and students, such as transportation and perdiem for their collaboration in the parks during summer months provided that they study questions of relevance to the department.

National institutes on research of forestry, marine resources, agriculture, climate, glaciology, and social or economic matters are often enthusiastic to work with the establishment and management of national parks. Likewise, other government departments can generally support parks by lending technical or scientific officers for periods of time or specific projects of mutual interest. The park department may barter such scientific or technical services, providing support to other agencies.

Foreign institutes and universities are anxious to study a variety of world-significant problems. Often they will come and work in parks for extended periods of time given that local permits and certain facilities can be provided.

A common problem in working with local or foreign researchers is to establish procedures and regulations governing what is done, how it is done, what kinds of reports are submitted and the ownership of collected specimens. While there has been negative experience in the past, those departments which have implemented procedures and regulations have found that collaboration within the context of clear terms of reference can be extremely useful.

Ultimately, it is considered by many departments that their management capacity will have to be expanded to include scientists and highly trained technicians on their own staff. Few departments will ever attain the size such that their own personnel will be able to investigate all of the problems. However, departmental scientists and technicians would be able to supervise, select and control all research and ensure that the results are presented in a manner useful to decision-making.

7) Evaluation of Park Management Activities. Considerable energy and funds are spent on building facilities, managing habitats, conducting visitors, in starting interpretative programs, and in trying to inventory and learn about the resources of the parks. Little if any input is made in observing the results of each management activity. What is the reaction by nature and people to what the department has, or has not, done?

What is required is that each department develop a simple procedure for "monitoring" management activities, development projects, and the natural and cultural resources. Observations on relevant indicators must be made and evaluated. The monitoring system then ensures that the implications are given to decision-making.

This is for internal control of park management. There is also the monitoring of parks in terms of human welfare and the human habitat. Technology is now available to explore the biosphere and the implications of man's activities upon its health. Some such technology is highly sophisticated, involving computers and satellites, but a great deal consists of simple observation and normal instrumentation. For example, the run-off from important watersheds relates to potable water supplies, hydroelectric power, irrigation, navigation and fisheries. What effects are being caused by human activities elsewhere? Mining, logging, tourism, transportation, agriculture?

Among other things, parks are established as bench marks for the biosphere. They show what it was like before man's technology so greatly increased. They provide models of the past, of working natural systems, of how the environment copes with pollution and how it lives without it. With a network of national parks involved in environmental monitoring on the key issues of man, such as water run-off (including flooding and drought), agricultural pests, earthquake, volcanism, plant succession, marine productivity, and the like, parks suddenly become related to man where it is most relevant to his welfare. Parks are no longer apart from man, unutilized areas set aside free of man. They are managed to remain in a natural state in perpetuity in order to be able to assist man with his greatest problems.

These concepts have been formalized in the Unesco sponsored Man and the Biosphere program which seeks to support governments in the establishment of a network of reserved areas to serve for the study, understanding and maintenance of the human environment. This program will be explored more fully in Chapter XI.

Similarly, the United Nations Environmental Program (UNEP) has established the Global Environmental Monitoring System. The purpose is to develop a network of monitoring stations in all biomes of the world and to gather and store information useful for the study, analysis and assessment of environmental factors. This program will also be considered fully in Chapter XI.

Suffice it to note that these programs of world-level significance require natural reserves to be utilized as "control plots" for learning how to care for and maintain the planet. Parks can and ought to be in the center of this program. Where are the protected natural areas? Who has been developing managerial capacity during fifty years in Latin America, and over a century in the world? To set up other organizations, laws, policies, and networks of natural areas is rather a redundant investment for developing countries.

The central question related to environmental monitoring is how to select natural areas and manage them to be useful for this purpose. When that criteria is available it will probably lead to the modification of existing park boundaries or at least their internal management. Eventually, new parks should be designed to consider this as a normal activity and output of parks.

8) Alteration and Destruction of Wildlands. There are many kinds of alteration and destruction of wildlands including colonization, logging, hunting, agriculture, and such things as road and powerline construction, mining prospection and human settlements. Obviously, whether these activities are positive or negative depends upon ones point of view.

The problem lies not in judging if they are "good" or "bad", but in the process by which wildland is allocated for such development. Specifically, wildlands are being irreversibly altered before being examined to determine their environmental significance. Is the site a critical habitat for animals or plants? Is the drainage such that flooding or excessive drying will occur elsewhere if this site is altered? Swamps are drained with little regard for the fact that they are the centers for the transformation of many important nutrients. Coastal developments destroy coral reefs which provide habitat to a large proportion of fish eaten by humans.

The park department can be a useful member of any decision-making team assigned to allocate wildlands. Their environmental point of view will often appear like a negative attitude to block development. Actually, it is concerned with providing insurance for human development. Some sites should be provided permanent management in their natural form. Some can be combined with other selected activities.

With the systems perspective discussed above in problem number two, the department must develop the capacity to analyze natural resource systems, to suggest conservation units of different categories as appropriate for environment and development. Where do resources flow, where do they stop momentarily to eat, grow, respond, combine with other elements of the system? Curiously, the best support for food production will often involve ensuring that certain lands do not get put into agriculture! To open the upstream areas is to kill and eat the chicken while others innocently continue to depend upon the eggs.

Many forms of alteration and destruction of natural resources are the result of social, economic and political problems and the park department has only limited means to correct them. Some so-called destruction is actually a product of ancient cultural practices on the land and should be studied, and perhaps these practices should be respected rather than eradicated.

9) Awareness of International Programs, Criteria and Activities. A very common current problem is the inability to keep informed about all that is going on in conservation. There are several meetings each month, more publications than a person can read even if he retires from active work, and conflicting criteria and values within the conservation movement. What does a park officer in Latin America do to make any sense out of all this?

The most positive manner to become aware is to become involved. The key programs of each international organization related to conservation will be reviewed in Chapter XI. For example, IUCN can be joined by states, organizations and individuals. It distributes a newsletter, holds technical meetings, publishes conservation literature, and maintains commissions on national parks and protected areas, species survival, law and policy, ecology, education and planning and landscape design. Each commission has members and consultants from around the world. There is plenty of room for new enthusiastic cooperation with these groups.

The United Nations organizations, the Organization of American States and other regional bodies such as IICA, CATIE and CLAPN all prepare publications and information on their work. They welcome participation.

Experience would show that before departments of individuals enter into the international arena they would do well to gain experience in their own country. The reason is that principles and concepts can be usefully drawn from field experience in a particular context. Excessive theoretical or abstract work without the field work to back it, often leads to frustration because of inapplicability.

Specifically, each park department would be well to join IUCN, establish close ties with the World Wildlife Fund, communicate with the IUCN Commission on National Parks and Protected Areas, relate to the FAO Latin American Forestry Commission and the FAO Working Party on National Parks and Wildlife. A subscription to the UNESCO publications on the Man and Biosphere program is indispensable. Close contact with the national committee on MAB is also important. Be sure to be in contact with the UNEP Regional Office in Mexico City to become aware of activities of interest. The OAS efforts on the Western Hemisphere Convention for Nature Protection, its work on resource planning and other related activities can be discussed with the OAS Representative in each country. IICA also has a representative in each country. Central American and Caribbean countries will do well to communicate with the Forestry Sciences Department of CATIE in Turrialba, Costa Rica. CLAPN and the Caribbean Conservation Association can be contacted through their respective secretariats. Again, details on these organizations will be given in the next chapter.

10) Development of Mechanisms for Treating Problems and Opportunities on International Boundaries. Resources know no political boundaries. Watersheds are the most common example of resources which pass from country to country, defying ownership. Other examples include ocean currents, fisheries and birds.

Some very positive experience is being gained by the Inter-Governmental Technical Commission of the Amazonian countries and the Natural and Cultural Resource Commission of the Central American countries, as reviewed in Chapter II. The La Plata River Basin countries are working together under the aegis of the OAS.

Outstanding opportunities for mutual development lie in these examples as well as the cases of the Patagonian lake district of Argentina and Chile where thousands of hectares of wild lands are already in national parks and forest reserves. Taken together, the wildlands of the two countries in this area make up a world-significant resource for tourism and recreation, but collaboration will be required. Common management and development will be needed for long run consistency and to ensure that both countries receive appropriate shares of the benefits. The tri-country Monte Cristo area of El Salvador, Guatemala and Honduras is also a golden opportunity for contributing to the conservation and development of three nations.

How can an individual or a park department begin such a complex-looking process? Most such programs began with park and forestry colleagues holding informal conversations during international meetings. Often, international organizations have provided the context for such conversations and the exploration towards cooperation. Many meetings between colleagues of two different countries have occurred literally on the border, in a small hotel or campsite. While these conversations began as informal meetings between professional colleagues, these same individuals informed their directors; once matters became serious, these matters passed into the appropriate diplomatic channels.

Many of the problems which have been presented relate to matters of greater magnitude than the nation state. Resources cross boundaries, international organizations link otherwise isolated individuals, many training courses are available in foreign lands. It is undoubtedly important to become informed about the international mechanisms related to conservation. Then the challenge is to put it all together. With a systems perspective in mind, the nation state is, after all, one zone of a continent. Regional cooperation is imperative and requires a strategy if parks are to contribute to conservation and development.

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CHAPTER XI

INTERNATIONAL CORPORATION AND ASSISTANCE IN NATIONAL PARK MANAGEMENT

Introduction

At the end of the Second World War, the period of world decolonization began. The newly independent countries as well as other developing nations began to push for economic and social development. By the late 1950's the development effort reached major proportions. Forests gave way to agriculture; estuaries to harbors; rivers to reservoirs and dams; coastlines to hotels and resorts. Wetlands were drained and filled, and dry areas were flooded and irrigated. The capacity of man and his technology was "changing the face of the earth."[1]

As could be expected, the same application of technology for the benefit of human welfare could also transform portions of the human habitat into biological deserts. The negative side of development projects has already been documented.[2]

During this surge of development activity the conceptual framework was basically simple: Developing countries (in general) had abundant under-employed labor, plenty of land and natural resources, and a scarcity of capital and technology. The solution was to inject money, "know-how," machines, equipment, technology, education and other scarce items into the developing countries.

In the wildlands of Latin America this development process appeared first on the landscape often starting in the form of penetration roads being pushed into the forests and savannahs. Colonization, agrarian reform and various resettlement schemes followed the roads and established new agriculture, animal husbandry and human settlement. Rivers were impounded and diverted to supply electricity and water for towns, industry and irrigation. The original dwellers of the forest and savannah were pushed into more remote and generally less favorable areas.

Where were the conservationists during all this? They observed these activities with mixed emotions. They felt compassion for the urgent need to improve human welfare. They also foresaw the crisis being created within the human habitat. Latin American conservationists were active in the earliest international meetings calling attention to these problems and seeking solutions. While their arguments often appeared to be "antidevelopment," their message was one of caution against willfully altering or destroying the natural systems upon which man and his habitat depends.

The first major move towards international cooperation in conservation was made appropriately in the halls of the United Nations General Assembly. Dr. Harold Coolidge and colleagues stimulated the interest of delegates and then Secretary General Dag Hammerskjold in the orderly transfer of national parks from colonial powers to emerging nations during the decolonization. The Economic and Social Council of the UN mandated that the newly emerging International Union for Conservation of Nature (IUCN) prepare and maintain an up-to-date list of the national parks of the world.[3]

Many forms of international cooperation in conservation followed. The United Nations Food and Agriculture Organization (FAO) initiated the African Special Project together with IUCN.[4] FAO expanded its efforts to explore the options of rational development of wildlands, wildlife, and marginal lands in developing countries. By the mid 1960's FAO was operating the largest on-the-ground program in international conservation with projects and officers in countries throughout the developing world. The United Nations Educational, Scientific and Cultural Organization (UNESCO) also supported work in nature conservation from the early days of international cooperation and focused its major attention upon the restoration and maintenance of cultural monuments. Culture, similar to nature, was in danger of being overcome by the development process.

At the regional level, the Pan American Union promulgated the Western Hemisphere Convention at Washington in 1940.[5] While this effort remained only moderately effective during its first three decades, it did serve to stimulate conservation work by the Organization of American States (OAS).[6] The Inter-American Institute of Agricultural Sciences of the OAS (IICA) established the first training and graduate program to include ecology, wildlife and national park management, and natural resource conservation. Many of the region's leaders in forestry, parks and wildlife have and continue to come from the faculty at Turrialba, Costa Rica.[7]

Several individual nations, including Belgium, Canada, Federal Republic of Germany, Great Britain, Netherlands, Norway, Spain, Sweden, and the United States have supported conservation activities with particular countries of Latin America. Major roles have been played by non-governmental organizations including the IUCN, World Wildlife Fund (WWF), the Smithsonian Institute, the Charles Darwin Foundation and the New York and Frankfurt Zoological Societies.

The World Bank and the Inter-American Bank for Reconstruction and Development have initiated active endorsement and support for conservation elements of development projects. The posture of the banks and other institutions change to become favorable towards conservation in great part due to the United Nations Conference on the Human Environment, held at Stockholm, Sweden in 1972. Following that Conference it became acceptable to consider conservation as an element of development. The Planet Earth was considered to have limits to its biological productivity. Physical development, the use of chemicals, the design of cities, and the use of land would have to respect nature and natural systems as well as cultural monuments. The convictions of delegates and governments to these changing concepts were perhaps best manifested by the establishment of the United Nations Environmental Program (UNEP) following that Conference.

These United Nations, regional, non-governmental, bilateral and banking institutions have supported a wide variety of conservation programs and projects including the inventory of natural resources, the selection and management of national parks and reserves, the training of personnel, research, and physical development for tourism. There have been efforts at formal and popular education about natural and cultural resources.

In addition to the organizations established to support international cooperation in conservation, there have been conventions and agreements binding signatory nations in common concepts and activities. These legal documents relate to the control of trade in endangered species, the protection of cultural and natural heritage of world significance, and the already mentioned Western Hemisphere Convention. Agreements have been established among the Amazonian countries concerning the protection, management and development of conservation areas in the Amazon basin.[8] Other agreements are currently being developed on other topics of international interest.

The nations of Latin America have participated in the entire range of programs and projects from small one-man research activities to team projects and multi-million dollar programs. There is little doubt that international cooperation is critical and beneficial. Without it many important activities would not have been implemented at the opportune time. Scholarships, management plans, vehicles, buildings, interpretative programs, publications, new knowledge and understanding of resources, trained personnel and management techniques stand as testimony to the benefits of international cooperation in virtually every country of the region.

However, in every country where cooperative activities have been implemented, there is concern and doubt about the ways in which programs, projects and activities are planned, established, operated, and linked to follow-up efforts. Concerns and doubts about the efficiency and usefulness of international cooperation are also found in the international organizations. Mechanisms do exist by which problems can be analyzed and solutions discussed. Each organization has its general assembly, conference, board of directors, review panels or project evaluation missions. But, with the exception of field review missions, the other mechanisms seldom involve debate and the scrutiny of donor or recipient.

There is reticence on the part of both the recipient countries and the cooperating international organizations to openly discuss the efficiency and usefulness of conservation programs and projects. The reason for this appears to be simple: Conservation is grateful for anything which it receives! Don't bite the hand that feeds you! Basically, there is concern that too much debate may damage the cause of conservation and divert the already scarce technical and financial assistance elsewhere.

The implications of this impasse are important. Unless there is evaluation of past work, open criticism and feedback, there can be only limited corrective action to improve programs in the future. As a result, international cooperation can only slowly become more efficient than it is today. In practical terms, this means that scarce technical and financial resources which are being spent to salvage and manage scarce natural and cultural resources will be utilized at less than their potential effectiveness.

Attitudes about technical and financial assistance in conservation are slowly evolving. A great deal more change is required. At present, conservation projects depend upon the talent and sweat of volunteers and underpaid ecologists, foresters, archeologists, park planners, wildlife managers, and rangers, the funds of donors and the left-overs of international financial institutions and national governments.

As conservation becomes integrated into development, the conservationist will move from being the beggar on the street to a consultant, advisor and regular associate of the national planning board. The national park manager will gain a role parallel to the iron mine manager, the city water supply manager, the electric power supply manager, the chief medical officer of the hospital and the dean of a faculty at the university. All have in common their engagement in critical decision-making functions of society.

Several international programs have been established or initiated recently which provide mechanisms for this change to be realized. The Man and Biosphere Program of UNESCO, the World Heritage Convention of UNESCO and the Global Environmental Monitoring System of UNEP provide pragmatic opportunities to place the management of conservation areas and activities into the heart of development. The work of FAO, OAS, and CATIE provide the technical tools and support to actually manage conservation areas and activities. Other organizations provide specific support for training, research, equipment and supplies and physical development. The several conventions demonstrate mechanisms to organize and focus technical and financial resources upon the key problems of interest common to several nations.

These new programs and mechanisms suggest opportunities and alternatives which promise to carry international cooperation in conservation to a higher and more integrated level than ever before. They also provide perspectives for conservation work in the decades to come. Strategies for global and regional cooperation will be the subject of Chapter XII.

International Conservation Programs, Projects and Activities

The organizations which work internationally in the conservation field can be grouped into five categories: the United Nations Organizations, the Regional Organizations, the Non-Governmental Organizations, the International Banks and the Bilateral Agencies. Several organizations from each of these categories will be presented briefly.

The United Nations Organizations

The United Nations Education, Scientific and Cultural Organization (UNESCO), the Food and Agricultural Organization of the United Nations (FAO) and the United Nations Environment Program (UNEP) work with their member governments. Generally, projects are approved by the governments and that United Nations Organization technically competent for the type of cooperation requested. The funds are provided by the United Nations Development Program (UNDP), the United Nations Environmental Fund (UNEF), one of the international banks, or by a national development agency from a donor nation. The projects are implemented by the government department of forestry or natural resources and counterpart professionals from FAO, UNESCO or UNEP. The projects normally relate to the survey of natural or cultural resources, the selection of establishment of areas or sites to be managed as parks or reserves, the training of personnel, the education of officers for leadership positions in the department, and the preparation of manuals and guidelines for management and development.

The Regional Organizations

The Organization of American States (OAS), the Inter-American Institute of Agricultural Science (IICA) and the Center for Research and Education on Tropical Agriculture (CATIE) work with member governments. The OAS has supported individual and groups of nations in the inventory and planning of river basin development and the land use of large regions. These projects have included provision for wildland reserves. The OAS supports scholarships for graduate training in the management of natural resources including national parks and wildlife. IICA originally carried out much of its program and project activities through its graduate training center in Turrialba, Costa Rica. IICA initiated the series of faculty seminars in southern South America which led to the establishment of wildland management in the curriculum of the Forestry Schools in those countries. IICA also trained and educated many leaders who have directed forestry, natural resource, wildlife and national park departments and forestry faculties, and have become international consultants and experts with international organizations. IICA supported some of the earliest conceptual studies on wildland management and national parks in the region.

CATIE, the former Turrialba Center of IICA, has now become a dependency of Costa Rica and the Governments of Central America and the Caribbean. In 1977 the Forestry Sciences Department had a staff of 17 with work in graduate education, training in specialized fields and field research concentrated on wildland management, multiple-use management of forest lands and the utilization of the humid tropics.

The movement towards economic integration in Latin America began in the early 1950's. The objective was to develop means to "encourage more efficient utilization of available resources and opportunities and to stimulate integral economic integration among the participant countries."[9] Five regional and sub-regional organizations have been established: The Latin American Free Trade Association (LAFTA: Treaty of Montevideo); The Central American Common Market (CACM; Treaty of Managua); The Andean Subregional Group (ANCON: Cartagena Agreement); and the Caribbean Community (CARICOM; Treaty of Chaguaramas).

While these bodies do not work in specific natural or cultural resource fields, the Andean Subregional Group has established a permanent body consisting of the Directors of Natural Resources or Forestry which meet regularly to coordinate their activities in the location and establishment of conservation areas, training of personnel, research, law and policy relating to national parks and wildlife conservation within the context of overall natural resource and forestry management and development.[10]

Non-Governmental Organizations

The International Union for Conservation of Nature and Natural Resources (IUCN) is a union of sovereign States, government departments and non-governmental organizations which have joined together to promote the rational use of plants, animals and the environment as a whole. It is the world's only independent international scientific body dealing exclusively with all aspects of nature conservation. Starting with the African Special Project in 1960 in collaboration with three other international organizations and 19 African nations, IUCN has been one of the pioneers in international cooperation in conservation. Programs now include the conservation of islands, deserts and tropical rain forests, the protection of migratory animals and a special program for the rational use of the world's oceans.

Within IUCN there are several technical bodies called commissions. They are the Survival Service Commission, Commission on National Parks and Protected Areas, Commission on Ecology, Commission on Education, Commission on Landscape Planning, and the Commission on Environmental Law and Policy. In addition, there is the Marine Program, the first truly integrated effort in international conservation. This program focuses on the protection and rational use of marine animals, particularly the highly mobile species, the establishment of regional systems of marine parks and reserves for the protection of critical marine habitats, and the developing, testing and promotion of model management systems for the maintenance of important marine processes.[11]

The World Wildlife Fund (WWF) is a sister organization to the IUCN. It has primarily devoted itself to the raising of funds to support critical conservation efforts around the world. In conjunction with the technical staff in IUCN and the various WWF national offices, the WWF identifies key species or areas in need of immediate action. Funds are raised and channeled directly to government park and wildlife departments, universities, institutes and individuals capable of carrying out the required action. The WWF works directly with the IUCN on major programs such as that for tropical rain forests and marine resources.

The Latin American Conservation Association and the Caribbean Conservation Association (CCA) are small but rapidly developing non-governmental associations of institutions and individuals in tier respective regions which have joined together to promote conservation of natural resources. With the increasing role given to the non-governmental organizations by UNEP and the environmental movement in general, these two bodies can be expected to have increasing responsibilities to represent the voice of their constituencies.

The CCA was founded in 1967 and maintains offices in Barbados. Its scope includes the preservation and development of both natural and cultural heritage. Activities include the collection of information on environmental matters, advisory services to members and governments on conservation issues, locating and focusing financial and technical assistance, and promoting environmental awareness in the sub-region.

The Latin American Committee on National Parks (CLAPN) is a working group made up of interested and dedicated individual conservationists. CLAPN holds periodic formal business meetings, technical working sessions, and seminars at the regional level. It has been particularly successful in establishing positive linkages between tourism and nature conservation.[12]

Then there is a large group of very important organizations primarily located outside of Latin America, but which support significant conservation work in the region. Each has supported a long list of projects with funds, expertise, equipment and supplies. Among these groups are the Audubon Society, the Charles Darwin Foundation, the Fauna Preservation Society, the Frankfurt Zoological Society, the Island Resources Foundation, the Nature Conservancy, the New York Zoological Society, the Philadelphia Conservationists, the Rare Animal Relief Effort, the Rockefeller Brothers Fund, and the Sierra Club. Their activities have included work on individual species, the preparation of management plans, the construction of physical facilities for research stations and national parks, the purchase of lands in critical habitats, the training of guard personnel, the development of planning techniques and manuals, training seminars and workshops for professionals and university professors of forestry, and scholarships for educational programs abroad.

International Banks

The World Bank, the International Bank for Reconstruction and Development (IBRD) and the Inter-American Development Bank (BID) finance major development projects throughout the region including hydroelectric dams, irrigation projects, highways, communications, ports and harbors, airports, agricultural colonization, forestry development and industrialization schemes. Recently, these financial institutions have initiated support to conservation elements of development including watershed management as part of river-basin development projects. Support is slow in coming, however, to projects which are designed to maintain and enhance the human habitat. Perhaps, the contrary is more significant; projects are only beginning to be presented to the banks which request support for the management of natural resources for conservation purposes as part of overall development.

Within Latin America there are three sub-regional banks: the Central American Bank for Economic Integration (CABEI); the Andean Development Corporation (ADC) and the Caribbean Development Bank (CARIBANK). These institutions finance development projects in their respective sub-regions. Support has been given directly for conservation projects including the development of national parks in Costa Rica. In the case of CABEI, recognition has been given to the fact that investments in conservation can be directly supportive to development where appropriately designed.

Bilateral Agencies

The United States Peace Corps Volunteer program supplies specialists in the environmental fields to Latin American Governmental organizations, universities and other institutions. Among the fields most requested by forestry, national park and wildlife departments are national park management, wildlife management, and biological research. The program also has been supporting volunteers which are specialized in interpretation, planning, engineering, architecture, art, and other related aspects of park management and development. The volunteers which are in the environmental and scientific fields are recruited and supervised by the Smithsonian Institute, which provides the necessary technical support.

The Agency for International Development (USAID) has supported the planning, management and development of the Los Katios National Park through cooperation with the government of Colombia along the border of Panama and Colombia in the Darien region. The park forms part of the development plan for the boundary area through which the Pan American Highway will pass. The park will form part of the buffer zone for the control of hoof and mouth disease.

The Federal Republic of Germany has supported projects to study important species including the crocodilians and the vicuña in the Manu National Park and the National Vicuña Reserve of Peru, respectively. Both projects include research, management and development activities. The Vicuña Project includes the feasibility of vicuña products as an added element for rural development in the Andean highlands.

The governments of Belgium, Great Britain, Norway, Netherlands, and Sweden have supported projects and meetings on conservation in Latin America, and have supplied expertise as elements of FAO and UNESCO projects throughout the region.

Problems Common to International Cooperation

There are major benefits from international cooperation including the transfer of technology, opportunities for training and education, research on local resources and problems, the import of capital, funds and equipment, and the opportunity to share experience and knowledge. There is also the very important, but little mentioned benefit of developing an international fraternity of managers of natural and cultural resources. These various factors enable the host nation to pursue the benefits of park management which have already been examined in Chapter II.

There are problems associated with park management in general which have formed the basis of Chapter X. Where international cooperation is involved with park management, moveover, several additional problems arise. The problems of general park management are openly discussed and reviewed in international conferences and within national park department offices. However, the problems on international cooperation are seldom given the same examination.

In great part because of the attitudes of conservationists in the national departments and the international organizations, there is reluctance to start debates which may be interpreted as criticism of donors or technicians, or as controversy and a lack of solidarity in the ranks of conservation. The "opposition" appears to be so great to the conservationist that unity is to be maintained at almost any cost. The danger, of course, from this approach is that problems are swept under the rug and into the closets. Problems are discussed in small circles and attempts are made to take corrective measures, but improvements come slowly at best.

Of the many issues which could be considered, perhaps nine are most relevant and common to park departments around Latin America:

1. International projects tend to elevate the management capacity of the host park department beyond a level which is sustainable once the international assistance has terminated. During the past decade, many international projects have included activities in inventory, training, specialized education, management and development, law and policy, all of which reinforce the development of management capacity. The host government commits additional funds and personnel to work with the international staff. During the several years of the project, the department is capable of planning, management and development work. It has vehicles, modern equipment and employs modern management and administrative procedures.

But when the international assistance terminated there were almost immediate changes in the host department. The local officers had to adjust to the real world around them. Under the influence of the international project, many special considerations were facilitated to the department. These included a higher and almost guaranteed budget, the importation of foreign-made supplies, equipment and parts, and authorization to create new positions and hire new staff members of professional and non-professional grades.

As the special privileges were removed and the department became a "normal body of government," the personnel were obliged to return to the use of regular administrative procedures and, once again, faced the difficulties in obtaining replacement parts and supplies from abroad, and the standard long bureaucratic process for clearing imported parts and supplies through customs. Access to the Minister diminished. The rate of publications dropped and scholarships became scarce.

Why the drop in productivity and efficiency? Simply, what was created by the support of international cooperation was unsustainable in the local context once the international assistance terminated. For example, for the new capacity to be sustainable all the elements of the project would have to be duplicated. The hidden backstopping capacity of the international organization's headquarters and regional and national offices would have to be added to the host department. Is all this possible?

The solution lies in learning to plan the development of the host department to that level of managerial capacity which is appropriate to the needs of the country. This is a technical as well as an economic and political question. Very much like planning a system of national parks and the strategy to implement and operate the system, the appropriate managerial capacity can be objectively designed. Technically, there are parks to be managed, research to be supervised and carried out, facilities to be constructed, and various types of park visitors to be attended. Technically, there is an ideal number of employees of particular qualifications and grades. Economically, there is the reality of the national financial situation. Politically, there are priorities to be met in the national development plan, where parks may or may not be noted.

The international cooperation should seek to raise the level of management capacity to that considered appropriate for the host country. Only those technologies should be imported which fit into local ways of doing things. This is not a case of modern versus primitive, but one of appropriateness. There may be local techniques for accomplishing tasks which are more appropriate; and, there may be some which are more efficient by any standard. Scholarships should be given to study that which is relevant to local conditions. For example, there is a normal drive to join the so-called modern nations and to copy or better their imported designs. The returning scholarship recipient often finds frustration back in his office brought about by a lack of the "latest equipment," and archaic attitudes. All these values are relative, and current trends would indicate a definite movement towards medium and simpler technology.

The design of an appropriate management capacity is the responsibility of the host department and the international organization. Together they must develop a conceptual framework for building an institution which can live and grow on its own accord when the international experts step on the plane. Many tools and methods for this task have been presented in some detail in Chapters VI, VII and VIII.

2) International cooperation initiates a flow of equipment, parts and supplies which is unsustainable once the assistance has terminated. A brief look around the offices and buildings of most forestry, natural resource, park and wildlife offices in Latin America will find modern aerial photograph interpretation machines, photographic cameras,

microscopes, radio-tracking gear for wildlife, and other items which have become useless for the lack of some small spare part. Or, the equipment is in fine form, but it is impossible to purchase the necessary supplies locally.

Another problem is that the parts and supplies may be available locally, but at prices beyond the reach of local departmental budgets. A common example is color transparency film.[13]

The problem has two sides. Often the government awarded the international project special privileges for importation during the period of project activities. During that period the economy of the department becomes distorted into believing that color film cost $2.50 per roll, that new jeeps cost $4,000, and tires for the jeeps cost $35 each. Down on the street in front of the department there was a drastically different market. At the end of the project, the government removed the importation privileges, and the department was forced to deal on that market in the street.

The other side is the advisability of the international project not to bring in the "expensive and modern equipment and supplies" at all. If it can't be sustained, why start? The argument is generally presented that the government agreed to allow the department to continue to have access to the supplies following the close of the cooperative project. Did the government go against its word? Not necessarily. Often, the department can still import, but it cannot gain access to foreign currency to be able to import. In some cases, the department must pay import duties or taxes on the exchange of foreign currency for the purpose of importation.

Obviously the government is sovereign. But the problem must be faced honestly. The solution is to design the international project to include only that equipment which requires supplies which can be obtained locally or which can be imported subsequently at reasonable prices relative to the department budget. More specifically, the international organization should work with the central government ministries to prepare guarantees to importation and foreign exchange for the department for specified types of equipment or supplies. If the government is unwilling, the goods should simply not be brought into the host country in the first place.

An additional aspect of this problem is to carefully examine local facilities for maintenance and service. Some imported brands can be well cared for. Some have franchised mechanics and service centers locally. In one or two cases, a particular brand of jeep can receive spare parts from an automobile of another brand.

Project planning is again the solution. Similar to the design of appropriate management capacity, the equipment and supplies can be selected in terms of the appropriate capacity for the department, the laws and policies of government concerning important and foreign exchange, and the availability of parts and supplies locally.

3) Host governments are generally unable to meet the requirements of international organizations concerning counterpart personnel. A problem which remains under discussion throughout entire projects is the arrangement of counterpart personnel for each international officer.

The basic discussion evolves from the preconceived notions of each side. The host is looking at the immediate availability of positions in the department and of individuals capable of fulfilling the roles required. The international project director is striving towards the organization diagram which reflects what the department is supposed to look like in the future at some point when the international project terminates. The international view is normative -- what should be; the national view is pragmatic -- what can be. Both can be considered "correct." But they are obviously inconsistent.

There are several approaches to counterparts. The general model is where each international officer is assigned to work with a national officer. By working together on project activities, there is a transfer of knowledge and techniques to the national officer who becomes capable of carrying on without the international officer. This is the "one-to-one" alternative. Another approach is what may be called "group-to-group." In this case, the national personnel work together with international officers on the project activities, without identifying a person-to-person relationship. Each individual works with whichever officer is relevant according to the task. Over the duration of the project, each national officer will have been able to work with all international officers. The third option is to design the project along cooperative lines based upon a "team approach." The national officers consist of individuals required for the appropriate managerial capacity. The international officers consist of those necessary to support the development of this capacity. By design and direction, these national and international officers work cooperatively as one single team during the project with the single objective of developing the appropriate managerial capacity.

4) The "seed money syndrome." Many donors for international cooperation in conservation programs and projects provide substantial and important initial investments. Such so-called seed money is designed to support initial activities to get new efforts going. It is assumed and expected that the national host government department or other institution will then pick up the costs of continuing the work after the period of outside funds is exhausted.

The theory for this concept is that there is no regular source of funding for initiating important work in conservation. There may be no organization established to do pioneering types of work which require research, experimentation and pilot studies before implementation of full scale field applications can occur. The theory continues that in order to ignite the effort an external injection is required. It is presumed that once the work is moving and the benefits begin to become apparent, other regular sources of funding and support will absorb the program.

This type of work has been critically important in Latin America. It has been responsible for the development of manuals on park planning, workshops for university professors, the establishment of pilot national parks among others.[14] Without this type of support these activities would probably have never been accomplished. Certainly, they would not have been carried out in such a short period of time if regular program funds would have been required.

Thus, seed money has established the mechanism to study, design, implement, evaluate and document ideas and activities which promise to open new doors and reveal important potential benefits. No regular budget could afford to divert sufficient "critical mass" to explore such ideas. And, like all research and pilot studies, there is risk. The ideas might not produce positive benefits. Regular program funds may be too scarce to expend on risky ideas.

The syndrome begins, however, when the ideas have been explored and new and interesting projects are proposed for implementation. It is expected that the regular budget and staff of the national institution will adopt the new proposals and implement them. The seed money is usually withdrawn since it is believed by the donor that its part of the bargain has been completed.

The new activities will require additional management capacity. Who pays for that? For the department to implement the new ideas, some of the existing management capacity must be pulled from other on-going work and re-assigned to the new work. Is that rational? Normally, the managerial capacity of the department is already stretched too thin for its program of work.

The syndrome closes where the donor of the seed money grows concerned that the new proposals are not implemented. The seed money was provided on the understanding that if something useful came out of it, then the local department would implement it. Similar to the previously stated problems of international cooperation, there is a basic misunderstanding of the concepts and limitations of managerial capacity. The local department cannot simply add new professional positions to the civil service, hire new officers, provide the new officers with vehicles, secretaries, telephones, equipment and supplies, no matter how marvelous the new ideas may be. It is not a question of the interest or even priority of the local government department, but of fundamental constraints upon managerial capacity.

On the other hand, there is the mis-understanding of managerial capacity by the park departments themselves. Often the new proposal, tools, methods and techniques developed by seed money programs are capable of making management more efficient, or raising the productivity of the officers of the department, of helping the conservation areas yield more benefits, and of helping the department approach its objectives. The park departments cannot afford not to utilize these tools. A few weeks of training may provide the basis for a major jump in efficiency and productivity.

The unfortunate result of many seed money projects is that ideas are developed and prepared for implementation and then left unapplied. There are several solutions to be considered. First, seed money should be sought to support the development of methods and techniques which are really attuned to the needs of the park department. The way in which the results will be incorporated into the normal managerial capacity should be clear before the cooperative program begins. Both the donor and the host should insist on this clarity before signing agreements.

Second, there should be a clear concept of the limits of the managerial capacity of the department to orient the work within the realistic framework for future application. And, to get the maximum utilization of the methods and techniques developed with the seed money, funds should be included within the seed money project budget to cover the publication and distribution of a series of documents to share the benefits throughout the region. The seed money project should also include sufficient funds to support the application of the methods and techniques on a pilot scale to demonstrate the results and benefits.

Thus, the donor which provides seed money to support the research and development of new ideas must be prepared also to support publications and pilot application activities. The host department must ensure that the work fits within its capacity to absorb the new methods and techniques. The department should cooperate closely with the project and apply the methods and techniques as pilot projects to demonstrate their usefulness. If this cooperation is not carefully and realistically managed, the seeds will simply not germinate, or at least not be able to grow. The donors will cease to support the exploration of new ideas, and the departments will be generally restricted to work with existing methods and techniques without being able to explore and test ideas based upon the creativity and experience of their own personnel and individuals from international organizations.

5) National governments tend to give low priority to the management and development of national parks in Latin America. According to the presentation and examples given in earlier chapters, national park management should be one of the more important fields and activities in a government's program. A brief interview with the officer of the planning board or the ministry of economy, however, shows a different version of the story. What is different?

Virtually every officer of government, and most citizens which could be interviewed on the street would state that: Yes, there is a problem concerning the natural resources of the country. The citizen would add that this is a serious problem that someone ought to do something about. Yet, when it comes that that "doing something about it" part, it is discovered that there is only so much cash in the pot. The national treasury is capable of covering only a limited list of government expenses and investments. Which should be supported? There comes the problem. After food, housing, law and order, health and sanitation, education and communications and the military, very little remains. With luck, there are sufficient funds to pay the salaries of a few national park staff members.

Were the officers of the national park department, ministry of agriculture, planning board and ministry of economy to plan the ideal budget, surely national park management would be included along with many other things which seem never to get done. However, when the realities of budget and manpower are faced, national parks are at or below the red line drawn across the list of proposed activities.

Each and every other interest group whose work is at or below the red line on the budget are also claiming that the government does not assign them sufficient priority. Everyone wants some of the budget, everyone needs more, and many could use all of it!

The solution for national parks management is not to artificially jack the park activities up into the top priorities as a favor to international cooperative projects (and then let it fall back to its "normal" position). The solution lies in demonstrating the "true" priority of park management. Methods and techniques for this have been suggested throughout this book, and will be reiterated in Chapter XII. It must be shown that park management relates positively to education, food, industry, environmental conservation, peaceful international relations, cultural and natural heritage, future medicines and crops, and other items in the top positions of the national development plan. National parks relate to these key items by virtue of their remaining in a natural state in perpetuity.

6) Many programs in international cooperation are designed and implemented around personalities rather than institutions. Characteristic of international conservation is the strong identity of individuals. There is a Mr. Vicuña, a Mr. Condor, the man or woman who knows all about one plant or animal or a particular region; the individual who knows the "right people"; there is the local spokesman or woman of conservation who can open doors and get things done. This is not derogatory, but a fact. It is also natural in places where conservation is just beginning to flourish. There, no one has ever been paid to work on conservation, and whatever gets done is on personal time and out of deep personal dedication. Watching the destruction of the Andes, Caribbean islands, the tropical rainforest and coastal lands is certainly sufficient to create individuals with obsessions to conserve and to fight inappropriate development.

These local Mr. or Ms. Conservation is generally characterized by strong personality, unrelenting conviction, and the ability to work day and night. They gain the respect of others including high officers in government because of their dedication to goals which are generally political and nationalistic.

Because of this, these are the individuals which often represent the nation at international conferences. To the international community, these individuals appea to be the experts on their local areas. Soon they receive the mail, the invitations and the conservation awards.

All this is entirely natural and positive, up to a point. However, the overcentralization of conservation leadership thwarts the development of new individuals and new ideas and of a constant flow of officers needed to manage the national parks program. It can also force stagnation upon the nation by not leading to the development of local technologies and concepts for conservation.

The solution is for international conservation to work with the important personalities of conservation during initial phases of cooperative activities. It is necessary and useful to work with the key personalities to quickly identify critical points of interest for work. It is also morally just: these individuals have dedicated their lives to the cause of conservation.

However, as park management work becomes more technical, more modern and pragmatic, it is critical that many new local individuals be incorporated to ensure that the cooperative activities become institutionalized. The activities must also become balanced to represent a broader base of local culture and realism.

The solution requires that a plea be sent to the grand leaders of conservation in Latin America. Please continue leading, relentlessly pushing and encouraging governments and individuals to strive for a more harmoniously developed country. Please share your wealth of experience and insight with the young up-coming foresters, agronomists, biologists, archeologists and other related fields. Help search for new talent. Stimulate and give vision to the young. Be flexible on the new ideas of these individuals. Understand that they must have curiosity and must search and explore if they are to become good managers of parks and reserves. It is perhaps inconsistent to expect them to religiously follow orthodox and doctrinaire methods and solutions and at the same time be capable of contributing to realistic park management in the future.

And to the impatient and energetic young, please respect the older leaders. Listen to them, read all that they write. For there is wisdom in what they have to say, tempered by years of experience. Push ahead with the caution fitting to unique natural and cultural resources, but with optimism and enthusiasm in search of new ways to serve man and his habitat.

7) The "bank mentality" and its application to conservation and national park management discourages the integration of conservation and development. When park officers converse with the planning board, ministry of economy and the international and sub-regional development banks, there is a deep frustration arising from the fact that the economists ask questions which require quantified replies. How many this, how much that? What will be the rentability of investments in national parks? How many tourists can the park hold, and what will they spend?

This is a problem central to park management which affects not only relations with funding institutions but with national planning boards, and all bureaus which intervene in awarding budgets to the various government departments. What's it worth? the park officer generally is prepared with a list of typical conservation responses about the need to conserve species, save genetic resources, provide recreation, support tourism, save water, protect soils, and protect scenery. Everyone in the room nods positively. Deep down inside, everyone agrees and understands at least the surface of what is being said by the park officers. However, few grasp the significance of what is being said. They understand that water comes from the faucet, and that the lights will come on when the switch is thrown. They do not see what is going on in the watershed which makes all this possible. The relationship between national park management (and other reserves, too) and a glass of water and a 100-watt light bulb is abstract. When explained, there is laughter, polite smiles, maybe even mockery. The biological system can be grasped rather quickly, the fact that the system must be managed to remain a productive system is not.

Before quantification can occur, and before the banking mentality can be given appropriate response, park people must do their homework. The fundamental systems which trace the paths from natural and cultural resources and their management to the ultimate benefits derived by man must be studied. This is not a matter of years of research and sophisticated analysis. It is simple reasoning from the fundamentals of economics and ecology. The unusual method is to walk up the chain of events which produces the benefits. Where does the water come from?

With the systems explained, and the park officers able to explain them, the park people can employ the concepts which economists call "derived demand."[15] For example: so many bushels of food come from the irrigated valley. It sells for so-much money. (Moving upstream in the system) the water for the irrigation comes from engineering works which cost so-much to install and so-much to operate and maintain each year. These costs are covered by which agency, and where do the monies come from?

The water flowing into the irrigation reservoir comes from, say, a national park or reserve. The management of the area, including investments, operations and maintenance, runs to so-much per year. Dividing this cost per cubic meter of water flowing from the park, there is established a cost figure which includes all the expenditures for ensuring that the water flows, along with other park benefits. Does the price of food and amortization of the water engineering works include payments to the national park department for its part of the program? Surely not. But why not? After all, the park produces the primary input into the entire system -- water. Were it not for the park, and its managerial capacity, vehicles, roads, maintenance program, visitor education activities, and the amortization on the training costs of park staff, there might not be such a flow of water. The odds from other experiences are that the upstream valley would be colonized, eroded, and free of forests, setting up erratic stream flow, flooding and drought. Now, Mr. Banker, what is park management worth?

Utopian? No, actually quite realistic. The problem is that the banking mentality has not been employed on the side of national park management. The banker or economist wishes to make sure that the most is received for the investment. That is, he seeks efficiency (just like the park manager should be doing). To claim that he is narrow-minded, capitalistic, or unbalanced, is to ask him to be dishonest with his constituency. His tools are incomplete -- but whose fault is that? Iron, land, oil, electricity, urban and industrial water, wool, wood, food and other commodities have been evaluated, and tools have been developed to measure their values. These values are tentative and do not pretend to be absolute. But they work to help people exchange items including their labor.

The same effort should be applied to many of the resource systems and benefits associated with national park management. Not all park outputs will be measurable, but in most cases enough products or services will have market value to cover the necessary costs for the park enterprise.

The solution is to incorporate economics into park management. For conservation to join development, park management must utilize the tools of economic analysis and evaluation. Such a suggestion sounds unacceptable to many. Does it sound like trying to put a dollar value on religion? What it is, rather, is an attempt to evaluate those activities necessary to insure that the benefits become available and continue to remain available. Think of a phonograph record. Its price does not set the value people place on the musician himself. It merely reflects the cost of producing and distributing the recording, the income of the musician and others involved, and the interest of the people in obtaining a copy of the record. As another example, the value of land under a church reflects what that site could be used for, not the value of religion as such.

Where parks are planned as elements of development, there is no need to feel awkward about the value of the birds, ecological diversity or vanishing species, if the combined values attributed to water, tourism, recreation, education and rural employment are sufficient to carry the cost of the park and make it the "most economic use of the land."

There is also the value of policy and commitment. These are values which probably outweigh the immediate costs or benefits already mentioned. For example, the land must be kept in its natural state permanently if the area is to meet perhaps the most distinguishing objective of national parks: to maintain a sample of each major ecosystem, in its natural state, in perpetuity. These questions need study and it is in the interest of park management that some of these questions are given answers.

The solution does not pretend to place a dollar value upon all the elements of the natural or cultural system nor upon all of the benefits. Few other enterprises do either. The solution lies in accounting for the tremendous work which is required to manage the nation's natural resources and natural and cultural heritage, in order to be able to claim both the benefits and the costs. National parks may then be able to bring the many hidden costs and benefits into the open and onto the accountant's sheet. They may be able to obtain bank loans, credits and grants in a manner similar to water works, electrification, transportation, and other government projects. Most of these latter projects do not pay back loans from their own receipts. They presumably contribute to national development and therefore, the repayment of the loan comes from the national treasury which hopefully has received added income because of the development project.

8) International cooperation projects often attempt to influence the hose countries with "ready made solutions." One image of the international consultant is the individual who arrives at the host country with a briefcase within which he carries most of his final report already written. The solutions are standard. Just ask him or her the questions, the answers will be quickly supplied.

In the work of national park management there is in fact considerable standardization. Moreover, there is a push by all nations towards greater standardization, particularly in terms of definitions and norms for national parks and other protected areas.[16]

The problem lies in the fact that traditional conservation has tended to standardize the means to management rather than the objectives. Traditionally, what is said to be important is that hunting is not allowed. More relevant by far is to articulate the objective to which the wildland resources of a particular area are committed.

The solution lies in planning the selection of objectives and the alternatives for reaching them; the question of means should be left to the analysis of management. With this method, it is difficult to import standardized solutions for park planning and management. The work of analyzing means for management must be done on the ground in the particular site of interest. Vast experience of consultants is a great help in identifying objectives, following a systematic methodology for finding inconsistencies among the objectives, and designing the search for means. But the analysis of means is site-specific.

The host country must be prepared to devote time and resources to planning and not be overly anxious to start implementation. Time must be invested in a thorough consideration of objectives and alternative means. The means must be pursued to a level of detail which identifies to the host officers what exactly is implied by following any particular plan of action. Methods for this procedure have been presented in detail in Chapters V and VI.

The international officer arrives with his or her peculiar background and experience. It is often difficult for him to grasp the local culture, and it is natural that he feels familiar and comfortable once out in the wildland area. He may reason that deserts are deserts, forests are forests. Some species may be different to him, but that often appears to be minor detail. Soon he has the sketch pad out and lines are being drawn. A boundary here, a visitor center there, aye and how about putting the headquarters over there, isn't that a great view? So goes the dialogue after the consultant has been in the park or the country for a few hours or days.

The solution lies in the method for planning. If a planning method is followed explicitly, time is given to air all ideas and doubts.

Furthermore, the team approach to planning as suggested in Chapters V and VI has as a cardinal rule that the ideas of the participants must be challenged to ensure that all implications are examined. Even the international officer should be asked, why? Why should the visitor center be placed there? Why have one at all? When did that decision get made, anyway? The consultant will undoubtedly have valuable ideas on means, but the host officers have the right to understand how all decisions are made and upon which values they were based.

9) International cooperation carries with it the risk and possibility of cultural, scientific and lender imperialism. Three types of domination are common with technical or financial assistance projects. In most cases the domination is unintentional. It is due to the meeting of different cultures and value systems which is reinforced by the importation of technology and machinery. And generally the exporter is from another continent -- either Japan, North America or Europe. The problem is rather common: the foreign expert arrives with his technology or machines. Things are installed and the expert leaves for home. Within a few months, there is a breakdown. An expert returns, solves the problem and departs. Soon it becomes obvious that someone locally should learn how to maintain and adapt the imported technology. An individual is chosen to travel to the home country of the technology to learn the trade. But what must he do first? Learn the language, because the spare parts list and maintenance manuals are written in the foreign tongue.

With increasing volume of technology, machines, parts and service, it becomes easier to request that a branch office of the company be established in the host country. Soon there is a mixture of language, equipment, terminology and nomenclature. Since culture, language and religion (dogma, creed or ideology) are inseparable, it is virtually impossible to import only one element of another country. The introduction of a foreign vehicle, a method for interpreting natural history, ranger training handbooks, and techniques for building sign posts, all introduce elements of culture.

This is not necessarily negative. Many countries in Latin America and around the world have many positive aspects to contribute to one another and have greatly benefited from the immigrants, ideas and technology of other lands.[17] It is a question of being able to choose what is actually imported.

The solution to the problem of what some may call "cultural imperialism" is for the host country to consider not only the vehicles, books, expertise or designs to be brought into the country, but what other baggage will come with these items. Technology and equipment are not neutral, hard, cold items without life. They are products of culture. The host country must choose not only the items but the culture which shall in some way influence it. The international organization which is cooperating in the host country should ensure that the cultural effects are discussed openly with the host officers when the importation of technology and equipment is being considered. This is a sensitive matter, but to deny its existence is to argue with basic anthropology and with the obvious experience each Latin American country has known.

The second form of so-called imperialism common to international cooperation is that which Dr. Budowski calls "scientific imperialism."[18] He presents a series of cases where scientists actually impose their ideas, methods and will upon host institutions and countries all in the name of "truth" and the search for "knowledge."

Scientific methods pretend to know no culture or religion and to transcend language. Yet with some experience among scientists of various countries one can note the obvious difference between scientists and science in North America, Western Europe, Eastern Europe, USSR, Japan, Latin America and other world regions. Culture, language and religion or ideology are there, ever-present.

– The scientists in natural and cultural resources need certain conditions, machines, assistants, vehicles, land use conditions, privacy, and often a guarantee of many years of undisturbed continuity of particular experiments in specified areas. This is not necessarily negative. To follow the scientific method requires the systematic search for relationships among variables, and this requires time, isolation, and constant conditions where necessary.

The question to the host country is whether the questions being pursued by scientists are relevant to its interests. This is a very critical point to raise. Who knows best what is in the interest of the country? The question is not to judge what hypothesis of science are worthy of investigation, nor is it a simple matter of separating the hypotheses into those which are pure and those which are applied. At least in the management of national parks, there is little relevance to the concepts of pure and applied science. All are links on the multitude of chains of ecosystems and man's interaction with them.

In the final analysis, the crux of the question is that the host government and its executive departments must expend resources on these investigations. First of all, only a small amount of funds, manpower, and equipment can be devoted to investigation. Then, these scarce resources must be divided between the support of national scientific projects and international cooperative research projects. In Latin America there is a tremendous wealth of hospitality which spreads even to the extent of expending scarce resources to support visiting scientists even when it is not clear whether the results will help the country.

Some examples have been common to cooperative work in national parks. There is the scientist who carries out investigation in foreign national parks or wildlands. He finishes his work and goes home. He leaves nothing in the country except a few friends and some near worn out equipment which he donates to the counterpart department. He receives his Doctorado, a higher position at home, and an invitation to present a paper at the next meeting of a professional society or international organization.

There are still some scientists which make collections and fail to leave a set of samples for the local museum even though they have had to agree to do so in the permits which allowed them entry into the country to do their work. And there are those which decry the lack of cooperation of the host government as though everyone should drop everything else and work for them for the duration of their study. In their final reports or publications they go so far as to allude to the "lack or ideal conditions," or the "frequent interruptions in support" at the "study site," without ever stopping to add up the expenditures made by the host government on gasoline, vehicles, assistants, and administrative support. This support, as percent of the national government budget for one year, would be perhaps higher that the annual budget for the researcher's entire home university relative to his home government's annual budget.

The solution to the problem of so-called scientific imperialism is for the park department to outline its own research needs. Some scientific activities can be implemented in cooperation with local universities and research institutes. Some activities are clearly of an international cooperative nature and require relationships with institutions and scientists from other countries. Still other questions require methods and techniques which are not as yet developed in the host country and therefore must be "imported." All of this should be conceived as one consistent package.

These research activities which pursue solutions to management problems warrant the assistance and support of the national park department. These activities are intimate elements of their normal work.

Suggestions from outside of the department for research activities of importance to science and knowledge, to support agriculture, forestry and fisheries development, for environmental monitoring, to study watershed behavior or for medicinal research fall into a different category. They may all require natural areas and be valid uses of the park. Their results may be highly beneficial to mankind. There is no need to judge their importance. However, their support and financing must come from other sources than the national park department. The department has its budget and manpower assigned to manage the park, which includes making it possible that the suggested research activities can take place under natural conditions for short or long periods of time.

Additional allocations must be made to the park department to support these types of projects which do not directly relate to research on park management. It is sufficient that the park can "supply" the researchers with an outdoor laboratory (and perhaps an indoor one also) and other services from the department's regular budget. If researchers wish to ask for extra services like transportation, housing, supplies and assistants they should provide a special fund to the department (from government or non-governmental sources) for the purpose of supporting a particular research project.

In future years, the government may choose to add to the park department's regular budget sufficient funds and positions to enable it to incorporate cooperative research activities, such as environmental monitoring, as part of their normal duties.[19]

Other ways of avoiding so-called scientific imperialism can be suggested. In Peru, for example, all those wishing to conduct research in the national parks have their projects reviewed by the General Forestry Directorate, the Conservation Department and the local National Park Director. Projects are not permitted into the parks unless the park department can provide counterpart personnel and some amount of administrative support. The site for the work is chosen together with the researcher. A permit is signed by the researcher before he is allowed to enter the area attesting to the fact that he has read the rules and procedures for working in a national park and agrees to abide by them.[20]

Further elements of cooperative research include the provision by the international project of one or several scholarships for local graduate students to work with the foreign scientists[21] and the provision of equipment and supplies of a quality and design which can be well employed by the host department after the close of the project.[22] A final report in the language of the country, a lecture at the local university and park headquarters, and copies of photographs or collections should be additional provisions of cooperative research agreements.

The third kind of problem is "lender imperialism," where the organization which supplies the funds, expertise, equipment and supplies exerts power and influence in the management of the project. This problem goes beyond the relationship of a lender and debtor, where the lender is content when the money is repaid. In the first place, in conservation, the money is normally not repaid in cash (although the future should see loans and grants to conservation activities just like any other investment in development). And, the outputs of conservation are difficult to quantify. The lender becomes involved in the internal mechanics of the project with periodic review meetings to see that the host department is "properly" implementing the activities of the project. The lender suggests methods and techniques, and the names of "good" officers for particular jobs. This is not all negative. This service of the lender can be absolutely necessary due to the vast experience it may have accumulated by working in various countries for many years.

One major problem which arises from this is the process of "homogenization." The criteria used to judge project performance is similar for all countries. The same methods, techniques and names of experts are suggested to all hosts. Something like the consultant delivering ready-made solutions from his always-ready briefcase, the international lender develops ready-made criteria for judging projects, for writing project documents and requests, and models for doing the standard activities of all "good" projects. The individual host country's identity is challenged by this process.

As a result of the pressure to homogenize, there is a loss of opportunity to innovate and discover local methods and techniques to solve problems, to plan national parks, to choose means to meet the ends.

The lender can help solve this problem by becoming more sensitive to the right of each country to establish its own identity. Indeed, without the growth of identity and the opportunity to search for it, all project results will be of questionable value. Only methods, techniques, national parks and conservation works which make sense to the local culture will last. A project may have class "A" results by the international homogenized criteria, but fail completely the test of culturation.

Think of the problem this way: Park management has among its objectives the maintenance of the great natural diversity of the planet. Is it not then inconsistent to approach the maintenance of diversity with over-standardized methods?

International Cooperative Programs Which Relate to National Parks and Wildland Management

There are five major international programs and conventions which are currently in effect and which relate directly to the management of national parks and other wildlands. Each focuses upon a particular aspect of the management of natural and cultural resources and is administered by an international organization which acts as secretariat to an international board or council which is charged by the signatory nations with the direction of the program.

In addition, there are two conventions in the draft stage which, if developed and implemented, will also directly relate to national parks and wildlands.

Each program or convention will be reviewed briefly. The interested reader is urged to consult the original documentation which is cited, and to maintain close contact with the secretariat organizations in order to be kept up-to-date on these rapidly evolving topics.

Convention on Nature Protection and Preservation of Wildlife in the Western Hemisphere

The original Western Hemisphere Convention was established by the Pan American Union at Washington, D.C. in 1940.[23] The sections of this Convention which most relate to the management of national parks have been reviewed in Chapter IV. That convention, which was signed and ratified by most member states of the Organization of American States, commits those states to take measures in cooperation with each other to conserve nature by establishing parks, reserves, and protected areas by taking steps to manage and conserve wild flora and fauna and protect endangered species.

Since 1940 many changes have occurred in land use, terminology, the development of conservation institutions within government, environmental pollution, the exploitation of wild flora and fauna and the reduction of wildland. As such, some of the details of the Convention require modernization. However, the general concept of the Convention gained in relevance during the early 1970's as nations of the Hemisphere sought diplomatic, legal and administrative mechanisms to allow them to implement pragmatic cooperative activities in environmental conservation.

As a result of this growing interest in the development and implementation of cooperative activities among the nations of the Americas, a resolution was adopted at the second plenary session of the OAS General Assembly on 16 June 1976:

1. To urge the implementation of the Convention by the member states through mutual cooperation in activities such as scientific research and technical cooperation and assistance relating to wild flora and fauna, the creation, planning, and training in the management of parks and reserves, the adoption of measures to conserve wild flora and fauna and to protect species which are in danger of extinction.

2. To adopt measures to facilitate the discharge of specific responsibilities of the member states and of the OAS Secretariat under the terms of the Convention in furnishing and processing lists of endangered and threatened species and in disseminating information relating to nature protection and the conservation of wild flora and fauna.

3. To charge the Permanent Executive Committee of the Inter-American Council for Education, Science, and Culture to prepare a report and submit it to the next regular meeting of CIECC, examining the advisability of convoking a conference to discuss, plan and agree upon cooperative bilateral and multilateral activities such as those called for above.

The resolution further accepted the offer of the United States to host the suggested conference. Finally, the resolution urged all sovereign states of the Western Hemisphere to adhere to the Convention if they have not already done so.[24]

In preparation for the suggested conference, the OAS initiated a series of five technical meetings in 1977 to prepare position documents on critical aspects of nature protection and wildlife preservation. Topics include marine mammals, training of personnel for national parks and wildlife programs, the management of ecosystems, and the legal and policy issues related to the Convention.

The possible amendments to the Western Hemisphere Convention and the proposed changes within OAS to develop a permanent secretariat capability will become available through the national offices of the OAS.

Man and the Biosphere Program (MAB)

The MAB program was officially launched in 1970 at the 16th Session of the Unesco General Conference. The program, which has its secretariat within Unesco, is designed as a new approach to acquire an understanding of man and his habitat -- the biosphere. MAB is an intergovernmental, interdisciplinary effort to bring natural and social scientists together with decision-makers to seek solutions to the problems between man and his environment. Since these problems are common to many nations, cooperative research, education and training form the major activities in order to find and implement appropriate solutions.

The MAB program consists of fourteen projects: the first seven projects focus upon particular geographic regions of the world ranging from the tropical rain forests through the tundra and island ecosystems; the remaining seven examine specific problems such as the conservation of natural areas and genetic materials, pest management and fertilizer use, effects of major engineering works, urban governments and energy, environmental change and its effects upon man and the effects of pollution upon the biosphere.

Project 8 is entitled: "Conservation of natural areas and of the genetic material they contain."[25] Its purpose is to develop an international network of protected areas which are representative of the earth's biological regions. These protected areas are of vital interest and importance to the nations of the world because of their role in scientific research, education and training. They represent sample areas which serve as baselines or standards by which environmental change, pollution, and other ecosystems can be measured and judged. The network of representative areas should conserve genetic materials and samples of all of the world's biomes.

Considerable attention has been given to the development of an appropriate conceptual framework for the network of representative areas, each of which is to be called a BIOSPHERE RESERVE. Several panels of experts and individual authors have contributed papers to guide the development of the project.[26] To ensure appropriate coordination of the Biosphere Reserve project with other on-going conservation efforts including the national park, the International Coordinating Council (ICC) of MAB recommended at its November 1975 meeting to Unesco that the International Union for Conservation of Nature (IUCN) produce a publication to clarify the relationship between the Biosphere Reserve and other Protected Areas.[27]

The MAB Task Force for Project 8 recommended that a Biosphere Reserve should meet each of the following objectives: conservation, research, education and training. The Task Force defined these objectives as:

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1. To conserve for present and future use the diversity and integrity of biotic communities of plants and animals within natural ecosystems, and to safeguard the genetic diversity of species on which their continuing evolution depends;

2. To provide areas for ecological and environmental research including, particularly, baseline studies, both within and adjacent to such reserves, such research to be consistent with objective (1) above;

3. To provide facilities for education and training.[28]

The highest priority is to be given to conservation. And it is suggested that through the appropriate management of the biosphere reserves, the research, education and training elements of the various projects of MAB can be implemented successfully.

The characteristics of the Biosphere Reserve were summarized by the Task Force as:

1. Biosphere Reserves will be protected areas of land and coastal environments. Together they will constitute a world-wide network linked by international understanding on purposes, standards and exchange of scientific information.

2. The network of Biosphere Reserves will include significant examples of biomes throughout the world.

3. Each Biosphere Reserve will include one or more of the following categories:

   (i) Representative examples of natural biomes.

   (ii) Unique communities or areas with unusual natural features of exceptional interest. It is recognized that representative areas may also contain unique features e.g., one population of a globally rare species; their representativeness and uniqueness may both be characteristics of an area.

   (iii) Examples of harmonious landscapes resulting from traditional patterns of land use.

   (iv) Examples of modified or degraded ecosystems capable of being restored to more natural conditions.

4. Each Biosphere Reserve should be large enough to be an effective conservation unit, and to accommodate different uses without conflict.

5. Biosphere Reserves should provide opportunities for ecological research, education and training. They will have particular value as benchmarks or standards for measurement of long-term

changes in the biosphere as a whole. Their existence may be vital to other projects in the MAB program.

6. A Biosphere Reserve must have adequate long-term legal protection.

7. In some cases Biosphere Reserves will coincide with, or incorporate, existing or proposed protected areas, such as National Parks, Sanctuaries or Nature Reserves.[29]

In each nation which is participating in the MAB program, a National MAB Committee has been established to design and coordinate the local program activities among government departments, universities, scientists, educators, and land management institutions. The interested reader can contact the Committee through the national council on science and technology.

Convention Concerning the Protection of the World Cultural and Natural Heritage

The World Heritage Convention was adopted by the General Conference of Unesco at its 17th Session at Paris, 16 November 1972.[30] It provides for the establishment of WORLD HERITAGE SITES which have three fundamental purposes:

1. to protect, in perpetuity, sites, formations and objects of outstanding international significance;

2. to make these resources available for educational purposes of world-wide scope; and

3. to cooperate and share with all signatory nations in the benefits and costs of managing the Sites and in the educational activities.

Areas to be considered under the Convention will be restricted to those relatively few which are truly of international significance. It is assumed that each nation will provide the necessary protection and appropriate management in the form of national parks and other types of protected areas to those sites of national or local importance. Furthermore, it is assumed that national governments will work closely with other international programs and through national mechanisms to provide appropriate protection to sites and objects of international and national significance which cannot be covered by the World Heritage Convention.

As part of the program, a World Heritage Fund has been established to be utilized for the protection and management of high priority sites and objects. A World Heritage Committee has been elected by the signatory nations which will work with the Unesco secretariat in the selection of sites and objects to be placed upon the World Heritage List. Of those, some sites and objects will qualify for entry on the List of World Heritage in Danger, which then makes financial and technical assistance available to the nation for purposes of planning, training, restoration, protection or other management activities.[31]

Several reasons for the severe limitation of areas to be considered by the Convention have been enumerated:

1. the World Heritage recognition carries far more significance than a designation which is strictly national in origin;
2. by limiting the list to the relatively few areas that qualify, a more rapid action can be focused towards the protection of threatened areas of highest world priority;
3. the relatively small budget provided for by the Convention will be more productive when focused upon scientific, high-priority projects;
4. a small but well balanced program can be expected to present reasonable success and impact and thereby generate interest and financial support for an expanded future phase of work; and
5. it is to be expected that international funds will be available only, or at least at the onset, for areas of highest international significance.[32]

Criteria have been proposed by IUCN for natural heritage and by ICOMOS (The International Council on Monuments and Sites) and the Rome Center for Cultural Restoration for Cultural Heritage. The World Heritage Committee has approved the criteria in the following form:[33]

> Outstanding universal value will be recognized when a natural heritage property as defined in Article 2 (of the Convention), submitted for inclusion in the World Heritage List, is found to meet one or more of the following criteria. Therefore, each property should:
>
> (i) be outstanding examples representing the major stages of the Earth's evolutionary history. This would include sites which represent the major "eras" of geological history such as the "age of reptiles" where the development of the planet's natural diversity can well be demonstrated and as the "ice age" where early man and his environment underwent major changes (e.g., Olduvai Gorge in Tanzania);
>
> (ii) be outstanding examples representing significant on-going geological processes, biological evolution and man's interaction with his natural environment. As distinct from the periods of the earth's development this focuses upon on-going processes in the development of communities of plants and animals, landforms, and marine and

fresh water bodies. They would include for example (a) glaciation and volcanism as geological processes, (b) tropical rainforest, desert and tundra biomes as manifestations of biological evolution, and (c) terraced agricultural landscapes (e.g., the Serengeti migration or the Galapagos Islands) as interactions between man and his natural landscapes.

(iii) contain unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty, such as superlative examples of the most important ecosystems to man, natural features (rivers, mountains, waterfalls), spectacles presented by great concentrations of animals, sweeping vistas covered by natural vegetation and exceptional combinations of natural and cultural elements (e.g., Angel Falls, Venezuela; Mount Everest or Lake Baikal);

(iv) be habitats where populations of rare or endangered species of plants and animals will survive. This would include those areas where concentrations of plants and animals of universal interest and significance are found.

While individual sites may or may not qualify on their own particular merits, such individual items may form parts of complex natural areas which will qualify to demonstrate an array of features of global significance.

In addition to the criteria for the selection of natural heritage, each site should also meet the following conditions of integrity:

(a) The area described in (i) should contain all or most of the key interrelated and interdependent elements in their natural relationships; for example, an "ice age" area would be expected to include snowfield, the glacier itself and examples of cutting patterns, deposition and colonization (striations, moraines, pioneer stages of plant succession, etc.);

(b) The areas described in (ii) should have significant size and contain the necessary elements to demonstrate the key aspects of the process and be self-perpetuating. For example, an area of "tropical rainforest" may be expected to include some variation in elevation above sea level, changes in topography and soil types, river banks or oxbow lakes, to demonstrate the diversity and complexity of the system;

(c) The areas described in (iii) should contain those ecosystem components required for the continuity of the species or the objects to be conserved. This will vary according to individual cases; for example, the protected area for a waterfall would include all, or as much as possible, of the supporting upstream watershed; or a coral reef area would be provided with control over siltation or pollution through the stream flow or ocean currents which provide its nutrients;

(d) The areas described in (iv) should be of sufficient size and contain the necessary habitat requirements for the survival of the species.

Outstanding universal value will be recognized when a cultural property as defined in Article 1 (of the Convention) submitted for inclusion in the World Heritage List, is found to meet one or more of the following criteria. Therefore each property should:

(i) represent a unique artistic or esthetic achievement as a masterpiece of the human creative spirit (e.g., a group of buildings such as Angkor Wat or a site such as the Valley of Kings);

(ii) be of outstanding importance owing to the influence, over a span of time or within a cultural area of the world, on subsequent developments in architecture, monumental sculpture, garden and landscape design, or human settlements (e.g., the Pantheon in Rome);

(iii) be unique, extremely rare or of great antiquity.

(iv) be among the most characteristic examples of a type of structure, the type representing an important cultural, social, artistic, technological or industrial development (e.g., a Mayan pyramid or the central city of Leningrad);

(v) be a characteristic example of a significant traditional style of architecture, method of construction, or human settlement, that is fragile by nature or has become vulnerable under the impact of irreversible socio-cultural or economic change (e.g., an Indonesian longhouse);

(vi) be most importantly associated with ideas or beliefs, with events or the persons, of outstanding historical importance or significance (e.g., the Church of the Nativity at Bethlehem, the holy places of Mecca, or Cape Canaveral).

Cultural properties should meet tests of authenticity in their design, materials, workmanship and setting. This also refers to all subsequent modifications and additions over subsequent periods of time which may in themselves possess artistic or historical values.

Each nation which is a member of Unesco can become a party to the Convention, and then nominate sites to the World Heritage Committee for inclusion on the World Heritage List. Should the scarcity of funds or managerial capacity prevent the nation from providing the necessary protection of the property of world significance, then the nation can apply for assistance to the Committee by utilizing a special form to be provided through the Secretariat at Unesco Headquarters in Paris.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

On July 1, 1975, a 10-year effort to develop cooperative, international protection for vanishing wildlife culminated in the launching of the "Endangered Species Convention."[34] The objective of this Convention is to provide a means to control worldwide trade in specified wild animals and plants by requiring export and/or import permits. The import, export, or re-export of all species protected by the Convention is prohibited except under permit, or in some cases, with special documentation. The restrictions provided by the Convention apply to all international shipments, whether for private, commercial or non-commercial purposes. They also apply to parts and derivations of species, as well as to the living specimens.

Only those species which are affected, or likely to become affected, by international commerce are protected by the Convention. It is not the intention to cover the protection of all endangered or threatened species nor to relate to other forms of exploitation. The Convention regulates trade between countries and does to affect the movement of wild animals or plants within individual nations. It is expected that this cooperation among nations will enhance and complement the effectiveness of national conservation measures.

There are three Appendices to the Convention. Only those species listed in these Appendices are controlled by the Convention. In Appendix I, those species threatened with extinction are listed. Both an export and import permit must be issued by the official management authority of both countries for trade in the species listed therein. Permits cannot be issued if the import or export is primarily for commercial purposes. Generally, animals bred in captivity and plants artificially propagated for commercial purposes are excluded from Appendix I.

Appendix II lists species which must be monitored to avoid the threat of extinction. Trade in those species which are listed may be for any purpose but an export permit is required, to be issued by the management authority of the exporting country. A certificate may be used in lieu of an export permit for captive-bred animals and artificially propagated plants.

Appendix III lists species placed there by individual countries to reinforce domestic conservation programs. Each nation has the right to include species which are subject to conservation regulations within its boundaries. Trade of these species requires an export permit from the management authority of that nation.

EARTHWATCH and the Global Environmental Monitoring System (GEMS)

Growing out of the United Nations Conference on the Human Environment and the establishment of the Untied Nations Environment Programme (UNEP), the EARTHWATCH program is being developed to support environmental management. EARTHWATCH is comprised of four overlapping components: Monitoring, Research, Evaluation and Information Exchange.

The Global Environmental Monitoring System (GEMS) activity of the UNEP is being organized for the purpose of improving and integrating the capability of existing international systems to observe, communicate and process information on worldwide environmental conditions, and to develop new technology, procedures, techniques, and facilities to observe, communicate and process environmental information.

By 1975, the design philosophy for the GEMS was articulated as follows:[35]

> The monitoring of physical, chemical, and biological elements yields data and information essential for assessing on a systematic basis the health of man and his environment. The space and time scales of environmental processes are both long- and short-term, ranging from climate change and ecosystem evolution to the immediate impact of pollutants and natural disasters of human health and welfare. The essential elements of the monitoring portion of EARTHWATCH are global environmental observations, data processing and analysis, communication, related research and training programs. The mechanism by which this is to be accomplished is the design and implementation of a GEMS which will have as its objectives increasing quantitative knowledge and understanding of natural and man-made changes in the environment and of the impact of these on man's health and well-being and providing early warnings of significant environmental changes (including natural disasters) in order that protective measures may be organized.

Facilities will need to be installed in both undisturbed natural areas and in areas managed for agriculture, timber, fishery and other types of manipulative uses. In the first case, "reference sites" will be established to gather baseline information. In the second case, "impact sites" will be established to study change relative to the reference sites. Both types of sites will need to be interconnected with atmospheric, hydrological and inventory programs. In both cases, methods and instrumentation may be required which will necessitate that the sites remain undisturbed by human activities for certain periods of time. The "reference areas" will often need to be maintained in their undisturbed natural state for perpetuity.

Two additional conventions are in the draft stage. The International Union for Conservation of Nature (IUCN) is in the process of refining these drafts and laying the basis for future international meetings or conferences as steps in the process of eventually presenting the documents to governments for their consideration.

Convention on Conservation of Certain Islands for Science

The objective of this proposed draft Convention[36] is to set aside certain islands or parts of islands as reserves for scientific research. Generally, these islands will be remote and uninhabited. The Convention provides for cooperative scientific research on these islands by accredited scientists who will be given access to the islands for work on approved projects.

The original proposal for this type of activity was made at the 11th Pacific Science Congress in Tokyo, August 1966. Following further development, the IUCN prepared a draft text for Convention which was endorsed at the Regional Symposium for the Conservation of Nature -- Reefs and Lagoons, convened by the South Pacific Commission in Noumea, New Caledonia, in August 1971. The draft was later endorsed at the 12th Pacific Science Congress in Canberra, Australia, in August 1971. The draft which is currently under discussion applies to the entire world and has incorporated the views of the UNEP, FAO and Unesco as well as IUCN during its meeting in September 1971.

It is useful to note the preamble to the draft of the Convention:[37]

> THE CONTRACTING STATES,
> REALIZING that islands, because of isolation, limited size and other environmental characters, tend to develop specialized but often comparatively simple biotic communities;
>
> REALIZING the special value to science of islands as locations for the study of evolution, genetics, population dynamics, interaction between species and many related topics;
>
> REALIZING that island ecosystems, particularly small and remote islands which have evolved in isolation, are vulnerable and easily disrupted by disturbances arising from human activities;
>
> DESIRING therefore in the interests of mankind to conserve selected islands as sites for scientific studies;
>
> HAVE AGREED AS FOLLOWS:

The draft Convention then proceeds to state how "Contracting States may designate any suitable island (or portion thereof) or groups of islands under it sovereignty for inclusion in a List of Islands of International Importance to Science." The islands will include the surrounding waters subject to national jurisdiction including reefs, shoals and low-tide elevations. Each Contracting State will protect and manage the designated island and adopt and enforce the appropriate legislation or other measures as necessary.

The Convention provides for international cooperation in scientific research through the exchange of information on research programs, the invitation of scientific personnel to utilize such islands for research purposes, and the exchange and availability of scientific observations and results of research undertaken on islands included in the List.

As of October 1976, IUCN was actively promoting and supporting the preparation of a Conference to consider this draft Convention and its finalization and implementation. Further developments on this matter can be expected to be announced in the IUCN Bulletin.[38]

Convention on the Conservation of Tropical Rainforest

The IUCN, through its Environmental Law Center in Bonn, Federal Republic of Germany, initiated the preparation of a Convention on the Conservation of Tropical Rainforest as part of its major campaign to conserve that biome of the world. The rainforest is one of the oldest ecosystems on the planet, contains perhaps as many as 60 percent of the species of earth, and has a large role in environmental regulation which has yet to be fully explored and appreciated. It is also one of the ecosystems which is being most rapidly devastated as wood products and new agricultural lands are sought.

A preliminary draft of such a Convention was being circulated by IUCN to technical authorities during late 1977. It is expected that either a formal convention or other mechanism for international cooperation will be established during the late 1970's. Again, information on the progress of this effort will be published in the IUCN Bulletin.

Concerns for International Cooperation in Latin America

There are many issues related to international cooperation about which Latin Americans in the field of national park management share concern. Perhaps three are most outstanding: there is the apparent overlap and confusion in international programs, the need for some kind of regional training facility, and the lack of a mechanism for the development of common concepts and strategies.

Overlap and Confusion in International Cooperation Programs

Virtually every director of forestry, natural resources, national parks and wildlife will express the doubt that anyone has ever coordinated the above mentioned international activities. He is also sure that he is uninformed, or only partially aware, of such programs. The problem, as he explains it, is simple. If the responsibility for natural resources is located within the Ministry of Agriculture, then all information on natural resources, forestry, parks, wildlife, environmental law, etc., from FAO comes to his attention. Information from Unesco goes over to the Ministry of Education and/or Culture. Information from UNEP goes variably to one or several Ministers and those channels have yet to be clarified in practical terms. IUCN relates to its member organizations and individuals.

Newsletters, bulletins, invitations to conferences and technical meetings, and international visitors go to the ministry of foreign relations, to the council on science and technology, the planning board, or to different government technical departments depending upon formalized channels or personal contacts. But the fact of the matter is that in many countries, the national organizations which are custodians of national parks and natural reserves are little informed about the MAB Project No. 8 on Biosphere Reserves. Most have never seen a written piece of paper on the World Heritage Convention or the EARTHWATCH/GEMS Program. On the contrary, the Western Hemisphere Convention and the Convention on Endangered Species have been discussed and generally well documented.

More confusing are the examples where the director of national parks -- the government officer directly in line of legal authority from the Presidency to the public wildland reserves -- learns that colleagues in other institutions are receiving materials, attending meetings (locally or abroad) and giving concepts on how these new reserves should be managed. Obviously, something is amiss here.

Like most dilemmas, there are two sides to be explored. There is the problem that all international organizations which relate to conservation do not correspond directly with the department responsible for the management of national parks and other wildland reserves. This has been partially improved by the establishment in 1975 of the Ecosystem Conservation Group (ECG) consisting of IUCN, UNEP, Unesco and FAO. The problem of incomplete communication is well known by the ECG. There are traditional channels of correspondence which can only be improved slowly.

Alternatively, the individual nations have the option to organize themselves to ensure that appropriate communications take place once information on international conservation programs has crossed their borders. In most countries it is the national council on science and technology, or a bureau of the ministry of foreign relations which receives and distributes information, incoming mail and announcements related to international programs. In others, the National MAB Committee is employed to carry out this function. The development of proper communications is a difficult task and examples could be cited where a department other than that responsible for park and wildland management make recommendations to international organizations without the park department's awareness.

Other confusion exists. Most nations of the Americas have established national parks. Many have functioning systems of national parks. Some have among the most rapidly developing and rational systems of parks in the world. The suggestion of new types of systems of wildland areas by international organizations is received with some degree of concern. The Minister is certain to be in bad humor the day the Director General of Forestry requests that he consider establishing another large reserve with a new name and definition, shortly after he has become convinced that a network of national parks and other established reserves will provide for the nation's needs for research, education, nature conservation and other wildland benefits.

Are all these international programs really different? Or are they trying to say the same thing with various words? More close to the fact is that there are many interests wanting to see that selected natural areas remain properly protected and managed. The concept of what is "properly protected and managed" depends upon which interest group is consulted. And, there are new developments being made by interest groups which need wildlands but are unaware of the background on land management in their own countries as well as worldwide.

Hence, international programs reflect the awakening of scientists to their need for natural areas to do research. They have become impressed that natural areas are disappearing at an alarming rate, and that they too must lend a shoulder to ensuring that appropriate areas are protected. There is the growth of environmental awareness touched off so dramatically by the Stockholm Conference in 1972. Universities and research institutes need experimental areas and places for training and education purposes. Scientists and engineers have developed new technology to enable men to examine the human habitat with remote sensing, detecting such problems as agricultural pests and earthquakes before they destroy food and lives.

In short, there are new demands being placed upon wildlands. And with them, there are new fields, professions and institutions demanding wildland for "their" purposes. National park managers have been too busy trying to save natural areas to have had time to make the acquaintance of their logical allies. The challenge is to integrate. Parallel to the integration of economic and social development in Latin America already discussed, there is a need for the integrated management, development and use of wildland resources.

The areas which are designated to remain in some form of wildland management (conservation units) must be integrated into national plans and budgets to achieve adequate coordination and position among other national development and conservation activities. And, the conservation units should be placed under the custodianship of the competent land management organization which is experienced and responsible for the management of wildlands. If the organization does not as yet possess the managerial capacity, then it should be given the mandate and the opportunity to develop it.

Through national-level inter-agency committees such as those developed for MAB activities, the related governmental and non-governmental organizations, universities and institutions can support the management and development of conservation units. However, there must be a clear distinction drawn between the advisory role and the custodial role. The first is a user of the area, the latter is the manager of the area in the name of the citizenry of the nation and with commitments, through international conventions, to the citizens of the world.

The existing national parks, forests, sanctuaries and other reserves can be examined in light of the evolving demands for their use for such purposes as research, environmental monitoring, education and training, along with more established uses such as recreation, tourism, watershed protection and the maintenance of sample ecosystems. It should be kept in mind that none of these uses is new or surprising to park management, as was demonstrated in Chapters II and III. What is new is the broadening of interest in the management of wildland areas for scientific, environmental and heritage purposes. These new interests have given conservation new impetus and energy to complete the national networks of natural areas, to manage natural and cultural heritage adequately, and to employ these areas for education, research and training purposes. They provide mechanisms for international cooperation in the important endeavors.

A major practical question remains: how can a nation which has already implemented national parks and reserves address these new international programs? Does everything go out the window, and then things start again? Are national parks still relevant?

The solution is found in planning. As demonstrated in Chapters V, VI and VII, wildland areas can be planned, managed and developed for conservation and development. National parks have over a century of tradition and experience. They are the only universal method for managing wildlands. They and other wildland categories form the basis upon which new and evolving demands are to be built.

Appendix XI-A contains a detailed discussion on suggested mechanisms by which Biosphere Reserves and World Heritage Sites can be managed in a manner compatible with national parks, national forests, wildlife sanctuaries and similar established conservation areas. The conventions on "Islands for Science" and on "Tropical Rainforests" are still in the draft stage and their relationship to established conservation programs remains unclear.

The Lack of Training Opportunities Within the Latin American Region

The leaders of conservation in Latin America have expressed their concern for the development of training opportunities in the region since the earliest meetings of CLAPN, FAO and IUCN in the 1960's. Each meeting of the FAO Working Party on National Parks and Wildlife in Latin America has recommended to FAO that a regional training center be established in much the same way that FAO developed the English-language center in Mweka, Tanzania and the French-language center in Garoua, Cameroun. Concepts and ideas for such a Latin American center were further expressed by various authors.[39]

In 1972, the Government of Argentina requested FAO to assist in the preparation of a project proposal for expanding the already existent Ranger Training Center in Bariloche into a regional training center. The proposal was prepared and presented to the United Nations Development Program (UNDP) for financing as part of the national country program request for Argentina. Unfortunately, the political circumstances of 1973 caused this and other natural resource projects to be shelved.

Several aspects of the original proposal are worth noting because they represent the collective opinion of park managers and leaders from around the region. First, the central focus of the school was to prepare park rangers or middle-level guard personnel. This was the great demand in Argentina and around the region. The course was to require a secondary-school diploma and consist of 9 months of rigorous classroom and field training. The center was to serve as the main base for formal class work, equipment storage, and the residential area for staff and their families. But, the school was to develop field stations in other Argentine National Parks representative of the tropical forest, wetland, desert and semi-arid land, and coastal area environments. In this way, all guards, or select groups, could become acquainted or specialized to work in these particular environs.

Once the regular training courses were well underway, several innovations would be initiated during the three-month free period of the school. Top priority would be given to summer sessions for specialized groups such as biology teachers, civil engineers, hydraulic engineers, architects or decision-makers requiring environmental tools. Then recycling courses would be offered whereby previous graduates and older rangers would be given refresher training and further specialization in such fields as interpretation, search and rescue, mountaineering, marine park management, maintenance, planning and other more up-to-date items as they are developed.

Finally, some years later, an effort would be made to offer a special course for experienced officers from each country to be prepared as "training officers" -- to return to their respective countries and initiate or expand local training at the national level. This would not replace the demands upon the Bariloche center as conceived, in as much as new courses would be innovated and taught in the various specializations of park management.

Thus, the concept of the regional school was a very dynamic one. The course material would provide for the development of the basic cadre of guard personnel, but it would also follow their development and provide opportunities for up-dating and modernizing according to the needs of the countries. The school would extend its services into all the major climes of the region, and prepare officers to return home to begin local training programs. The school would also extend into related fields to give them the benefits of applied ecological concepts and tools. In Bariloche, it was also conceived that the school be closely associated with the Comahue University, the Fundacion Bariloche (an outstanding Latin American think-tank center of excellence) and other research and educational programs located there.

These concepts have remained alive. In 1976, the Government of Venezuela established its new Ministry of the Environment and Natural Resources. As part of that program, the establishment of a school for training national park and wildlife officers to man the rapidly expanding program in Venezuela is being considered. That Government requested the cooperation of the Department of Interior of the United States in the development of the School. As of this writing, the concept for the school includes a regional scope and intensive class and field work. The World Wildlife Fund, the U.S. National Park Service and U.S. Fish and Wildlife Service have made commitments to help support the school should it develop an international scope.

It is hoped that the concept of a regional center will become a reality, perhaps in Argentina, Venezuela or in several sub-regional locations. It is further hoped that the government departments of natural resources, forestry, parks and wildlife will support the development of such programs and make appropriate use of its benefits. But what of other regional training opportunities?

The International Seminar on National Parks and Equivalent Reserves (formerly the International Seminar on National Park Administration) offered by the U.S. Park Service, Parks Canada, the Mexican Government and the University of Michigan's School of Natural Resources has been one of the most successful training ventures in the park field and in international cooperation in any field. For years there has been discussion about holding this seminar in different continents on a rotative basis. More recently, as an alternative which is more realistic and meaningful, there is discussion concerning the possibility that each region of the world hold its own seminar. Under this concept, the North American Seminar would continue to function. It has unique material to offer, unequalled elsewhere. But most significant, it can share its experience in planning, developing and operating international seminars. Similar to the managerial capacity required to operate national parks, there is a great deal of capacity required to operate international seminars. Generally, for example, it requires the full time of one professional during some 8 to 9 months to plan and arrange for a seminar or workshop lasting 1 to 3 months.

The concept is indeed interesting. Imagine each continent or region holding its own periodic international seminar, with a working field trip through parks and reserves across the entire region. Interested individuals could participate in the seminar in their own region, and later on participate in the seminars of other regions of the world. Each seminar would have the leaders and managers of the region's parks and reserves as well as from other regions of the world. The transfer of experience and technology would be significant, and it would be the national professionals doing the transferring!

The Lack of a Regional Professional Organization of Natural Resources, Forestry, Park and Wildlife Officers

In several countries including Argentina, Brazil, Chile, Colombia and Mexico, there are now professional societies for foresters which cover the four mentioned fields in those countries. In Brazil, Mexico and Peru there are professional journals which serve to communicate among the members of subscribers. FAO publishes the quarterly UNASYLVA in Spanish, English and French from the Rome Headquarters and the Newsletter in Spanish from its Santiago Regional Office. Both serve to link foresters and related professionals throughout Latin America and around the world and are important contributions which have yet to be sufficiently employed by Latin America.

However, there is still a problem. When can Latin America conservation leaders assemble to discuss and plan common strategies for such activities of common interest as a network of parks and protected areas for the entire continent, the linkages between parks and forest reserves and the biosphere reserve and world heritage site concepts, and others? Several alternatives have been tried. The CLAPN has spent years in the attempt to develop a regional program. Important contributions have been made.

The FAO Working Party on National Park and Wildlife only meets every three or four years during which time the representatives of the individual countries often change. It is difficult to develop any aggressive program with continuity under these circumstances. This organ of FAO, however, has the advantage over others in that it is made up of government directors of forestry, natural resources, parks and wildlife. And, it is a statute body of FAO of the United Nations.

The Latin American delegates have met during the World Conferences on National Parks, the World Forestry Congresses, the IUCN General Assemblies, and coincident with other regional and world-level meetings. There is always the frustration afterwards that there is no mechanism to formalize contacts.

Yet, to the contrary, there are leaders which have experience in international cooperation and believe that there is little meaning to international activities unless there is a specific topic which binds people together in common interest. An example of this is found in the Amazonian countries with their Inter-Governmental Technical Committee on the Protection and Management of the Flora and Fauna of the Amazon. The body has held annual meetings in 1976 and 1977, with all countries represented. The meetings have been financed, arranged and directed completely on the resources and capacity of the individual countries. Field work on the selection of boundary parks has already been initiated. The Central American countries initiated their first and second tmeetings on regional issues with the support of international organizations. Now, as they continue, international support is minimal.

Thus, there are alternatives. An international organization can serve as convenor or organizer to provide the context within which regional professionals can develop programs and strategies. And, there is the example of the countries of the Amazon and Central America which have prepared their own programs with minimal assistance from international organizations.

A solution cannot be suggested to this problem. Rather, the remedy lies in the careful analysis of national priorities prior to over-enthusiastic involvement in dozens of international activities which can easily consume the entire managerial capacity of national park departments. This will be explored in the twelfth and final chapter.

APPENDIX XI-A

THE BIOSPHERE RESERVE AND ITS RELATIONSHIP TO OTHER CONSERVATION EFFORTS[40]

The design and implementation of the world network of Biosphere Reserves faces three problems which, with few exceptions are common to both industrialized and developing nations: first, wildlands which are unassigned or uncommitted to some specific development or conservation status are becoming scarce or are already non-existent; second, virtually all nations of the world have already developed some type of programs in forestry, national parks, watershed and wildlife conservation, fisheries and agricultural experimentation; and third, existing conservation and research programs already absorb substantial amounts of national budgets and skilled manpower. A final fact is that many existing national conservation activities relate in small or large part to the objectives and purposes of the Biosphere Reserve project.

Therefore, practical questions are faced by national-level land management, scientific and educational organizations as they consider the conservation, research, education and training objectives of the Biosphere Reserve project. For example, how do current national-level programs relate to the objectives of the Biosphere Reserve project? Can current management activities be re-interpreted and modified to support the Biosphere Project and still address other national requirements? In some cases, the priorities for the allocation and use of wildlands may require reordering. In others, the objectives and uses of on-going resource conservation areas such as National Parks, National Forests and Wildlife Reserves, may warrant some kind of realignment. And, more important, in virtually all cases, it will be necessary to search for the "gaps" in the existing system of protected areas. That is, there are ecological formations like forest types, wetlands, coastal zones or arid lands of which no sample has been put into conservation area status.

In this very pragmatic sense, the Biosphere Reserve project can be viewed as a major and timely effort to re-interpret or make more explicit the need for the conservation of natural resources, and to ensure that adequate emphasis is given in all conservation areas and corresponding programs and budgets, for research, education and training.

The evaluation of current management practices, the modification of programs and the establishment of new conservation areas, is a task which centers around issues of land management, policies for conservation and rural development, and the alternative uses to which wildlands, budgets and manpower can be dedicated. With this perspective in mind, the Biosphere Reserve objectives can be focused to guide relevant decisions:

1) At least one conservation area must be established in each of the world's natural regions[41] to protect and maintain samples of each region in an unaltered state, to protect all the genetic materials they contain and to provide for research including monitoring of natural ecosystems and for those educational and training activities which require natural environments. These conservation areas must be managed for immediate and long-term use in research, education and training activities, and to ensure that the samples of the earth's biological regions are passed on intact to future generations. The areas must be representative, that is typical of the biological unit to which they belong. They may encompass unique sites containing unusual combinations of flora and fauna, outstanding landscape features, various threatened species or other unusual biological or physiographical situations. The conservation areas must have internal diversity and an absence of human interference. The areas must be sufficiently large to be unaffected by adverse changes which may take place outside of the reserve, and to minimize the rate of species extinction.

2) Conservation areas must be established in each of the world's natural regions to provide for research, education and training on the effects of development activities and on the alternative techniques for the use of natural resources. For reasons of scientific design and ecological transferability of results, these human use-oriented areas are to be comparable analytically to the natural conservation areas of the first objective.

3) Some management units must be established on marginal, eroded and heavily altered lands and waters to provide for research, education and training, in relation to reclamation or restoration activities. The areas should be comparable to those associated with the first objective.

4) And finally, some type of management units must be established on areas where long-term human use of natural resources is in a stable relationship with the environment. Such areas are to provide for research, education and training in relation to the perspectives for the protection and promotion of such stable land-use systems.

To accomplish these objectives, four general types of land use or "management zones" are required:

a) A natural or "core" zone is managed for minimum interference from internal or external human activities. The zone serves as a reference, baseline or scientific study area and represents the most natural, unaltered or primitive remaining samples of the biological region. The zone must be as large as possible to continue functioning as an ecosystem, especially as adjacent land uses begin to include intensive technologies. And, the zone must be available for research, education and training in ways which do not materially alter the natural materials and processes.

b) A manipulative or "buffer" zone may be managed for activities such as timber cutting, grazing, agriculture, hunting, fishing, outdoor recreation and tourism, all in ways which are carefully controlled and do not drastically alter the natural materials or processes. This zone serves as an experimental or research area and may involve manipulative techniques to study the effects of man's activities and technology upon the natural system. Furthermore, this zone is generally located to surround the natural or core zone and as such serves to buffer the core from adverse external influences. All research and manipulative activities are to be designed, implemented and finalized in ways which are carefully integrated into the overall management of the area.

c) A reclamation or restoration zone encompasses areas where natural or man-caused activities or disasters have heavily altered landscapes to the extent where ecological thresholds have been exceeded, biological processes have been interrupted and species have locally become extinct. In this zone, research, education and training center around the demonstration area for the restoration of other sectors within the biological region.

d) The stable anthropomorphic or cultural zone is managed to protect on-going stable land-use systems where man and nature are living harmoniously. The zone serves for research, monitoring, education and training in reference to the study and understanding of traditional cultures and their technologies. The results can serve to promote more appropriate land use elsewhere in the biological region.

In addition, the objectives of the Biosphere Reserve project provide for planned and coordinated cooperative research, education and training activities on an international basis. Thus, in practical terms, these four zones are to be potentially available for study and observation by scientists and resource managers from the international community, subject naturally to the convenience of the host nation. The land management, scientific and educational organizations of the cooperating nations are presumed to participate in the development of a mechanism for international sharing of expertise and information, and to support the development of guidelines for comparable methods on measurement, research techniques, and the collection and storage of data. It is that each participating nation will support, to the extent possible, international cooperative activities in these designated zones with physical facilities, equipment and manpower.

The idealized Biosphere Reserve would have all four zones, each bordering on one-another as shown in Figure XI-A-1. The entire area would be administered by the same national organization, in cooperation with related groups and individuals through the national MAB committee. The area would be sufficiently large as to encompass a great variety of environments such that there would be little need for additional lands outside the Reserve for work on particular activities. The entire area would be dedicated in perpetuity by national law. There would be a

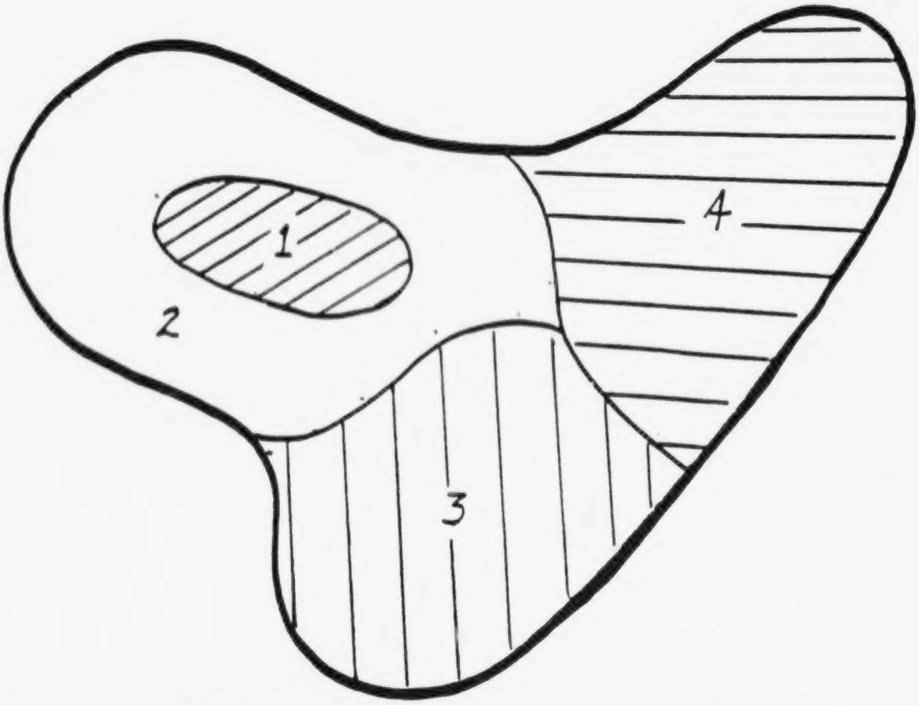


Figure XI-A-1. The Idealized Biosphere Reserve. All four types of management zones are contiguous. Variations on this model are shown in Annex 2 of MAB Publication No. 22.[42] The entire reserve lies within the same biological region.

1. Natural or Core Zone: Managed for minimum human interference, to serve as a baseline for the biological region; research, educational and training activiteis are carefully controlled and must be non-manipulative.

2. Manipulative or Buffer Zone: Managed for research, education and training activities and manipulative methods and techniques are permitted. Traditional activities including timber production, hunting, fishing and grazing are permitted in a controlled manner.

3. Reclamation or Restoration Zone: Managed to study and reclaim lands and natural resources where heavy natural or human-caused alteration has passed ecological thresholds, where biological processes have been interrupted or where species have become locally extinct.

4. Stable Cultural Zone: Managed to protect and study on-going cultures and land uses practices which are in harmony with the environment. Local residents and their activities are to continue, but new technologies may be strictly controlled.

modest field laboratory, dormatories, transport, and local trained staff to protect and manage the Reserve and guide visiting scientists, resource managers and educators. As necessary, local scientists would work on national and international research activities. Education and training courses would be held. Monitoring equipment would be installed to record base-line information and compare natural to modified sites and the results of experiments inside and around the Reserve. The natural zone is located in the form of a core within a surrounding manipulative zone capable of buffering the core from adverse external influences. All four zones are within the same biological region and provide for reasonable comparability among them.

In practice, however, several variations on this idealized model are necessary because of the scarcity of wildland, existing management and administrative structures and practices, existing conservation and research areas, and the overall existing pattern of land use:

a) It may be impossible to find an "absolutely" natural area in each biological region, sufficient in size and capable of being managed as the natural core zone. In this case, it is suggested that the "most natural" or unaltered remaining areas be designated as the natural core zone. While not completely natural, such areas will provide a relative base-line or point of reference to which subsequent research can be compared. This is particularly urgent and justified where dealing with biological regions which are of fundamental importance for the production of major food crops, commercial timber and fibers and animal protein. And, many of the last remaining stocks of genetic materials for important food and fiber crops are currently found only in disturbed areas.

b) On trying to provide a spectrum of options for different types of research, education and training within the same ecosystem, it may be difficult to locate a natural zone and a manipulative zone contiguous, one to the other. A solution may be found by locating the natural zone in the existing or potential scientific or primitive zone of a National Park, Monument or Forest. Similarly, the manipulative zone may be located in an existing Forest, Agricultural or Forest Experiment Station which lies some kilometers away. The remaining lands of the existing Park, Forest or Experiment Station may retain their dedication to normal activities. However, both areas must lie within the same biological region and be of sufficient size to ensure their long-term survival. The two areas, taken together, make up one "clustered" Biosphere Reserve as shown in Figures XI-A-2 and XI-A-3. that is, the minimum capacity of a Biosphere Reserve must provide for research, education and training in a natural, unaltered baseline area, and an area with existing and potential controlled alterations to study the effects of man upon the environment, both in the same biological region. To the extent possible, the restoration and cultural stable zones also should be included.

c) The natural and manipulative zones shown in Figures XI-A-1 through 3 will be fixed in location and dedicated for perpetuity by law. The needs of research, education and training may, however, require sites and conditions which are not always available in the natural or the manipulative zones. Suitable sites may be located on nearby farms, forests and Experiment Stations as shown in Figure XI-A-3, which may be of public, private or communal ownership. It is suggested that short- or medium-term arrangements (contacts, management documents, land-use plans, etc.) be made to provide access and temporary use of these out-lying sites, and to ensure adequate coordination of research, education and training activities with the normal residents and their uses of the sites.

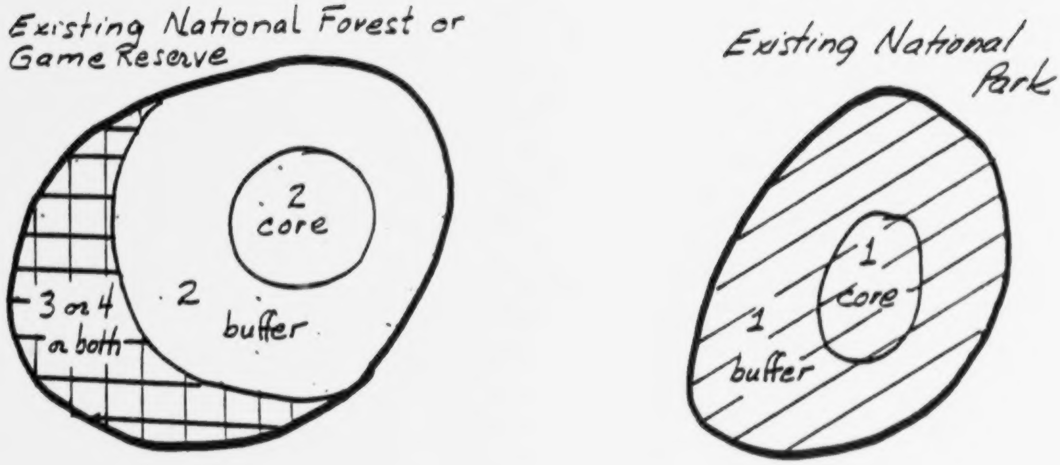
d) A further variation occurs when the several existing and newly created conservation and research areas are administered by two or more organizations. Presumably, national and local MAB committees can be organized to provide an interagency mechanism for coordination of activities among the several organizations and land areas.

e) Finally, at a particular moment in time, it may well be that only a natural, or only a manipulative, zone can be dedicated to the objectives of the Biosphere Reserve project because of various local restrictions which are expected to be resolved in the predictable future. Perhaps only one of the two zones can be found in some unallocated wildland or within an existing National Park, National Forest, Game Reserve, or Research Station. It is suggested that the single site be nominated as a first step towards the formation of a full Biosphere Reserve. Subsequently, when the remaining zone and complementary areas are formed, the nomination can be completed, and the entire complex given Biosphere Reserve status.

In order to ensure the efficient use of existing and future reserves, buildings, equipment and other investments dedicated to conservation and research activities, it is suggested that the MAB program be integrated with on-going activities in each nation. For example, the scientific zones of National Parks and National Forests, the watershed experiments in a Forest Experiment Station, the agricultural or medicinal experiments in an Agriculture Experiment Station, and the wildlife utilization studies in a Game Reserve may all be coordinated to study, monitor, demonstrate and teach alternative paths for land management and development in the given biological region.

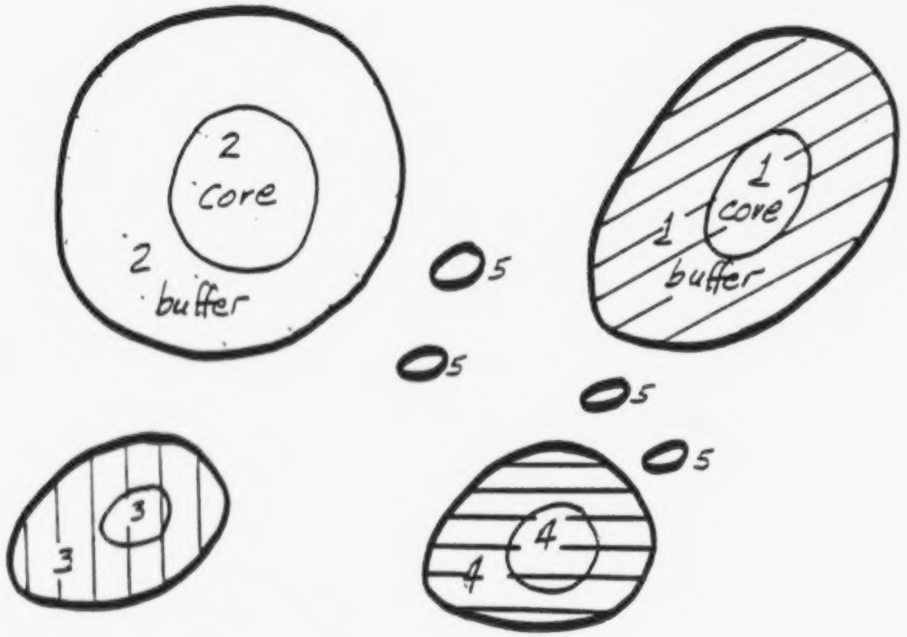
Regional cooperation is encouraged where two or more nations find it advantageous to coordinate and integrate conservation, research, education and training activities to avoid duplication of efforts and investments. Such opportunities are obvious where particular biological regions pass through the boundaries of two or more nations. Boundary parks and reserves may serve as a mechanism to focus bilateral or multilateral cooperation as sketched in Figure XI-A-4.

Administratively, one of several alternatives may be advantageous for any particular nation. For example, in some cases it may be most appropriate to dedicate entire portions/sections of existing conservation and research areas to the objectives of the Biosphere Reserve Project. This may be realized within existing national and provincial laws, nomenclature and institutions. In other cases, some changes in the regulations and management of existing areas will be



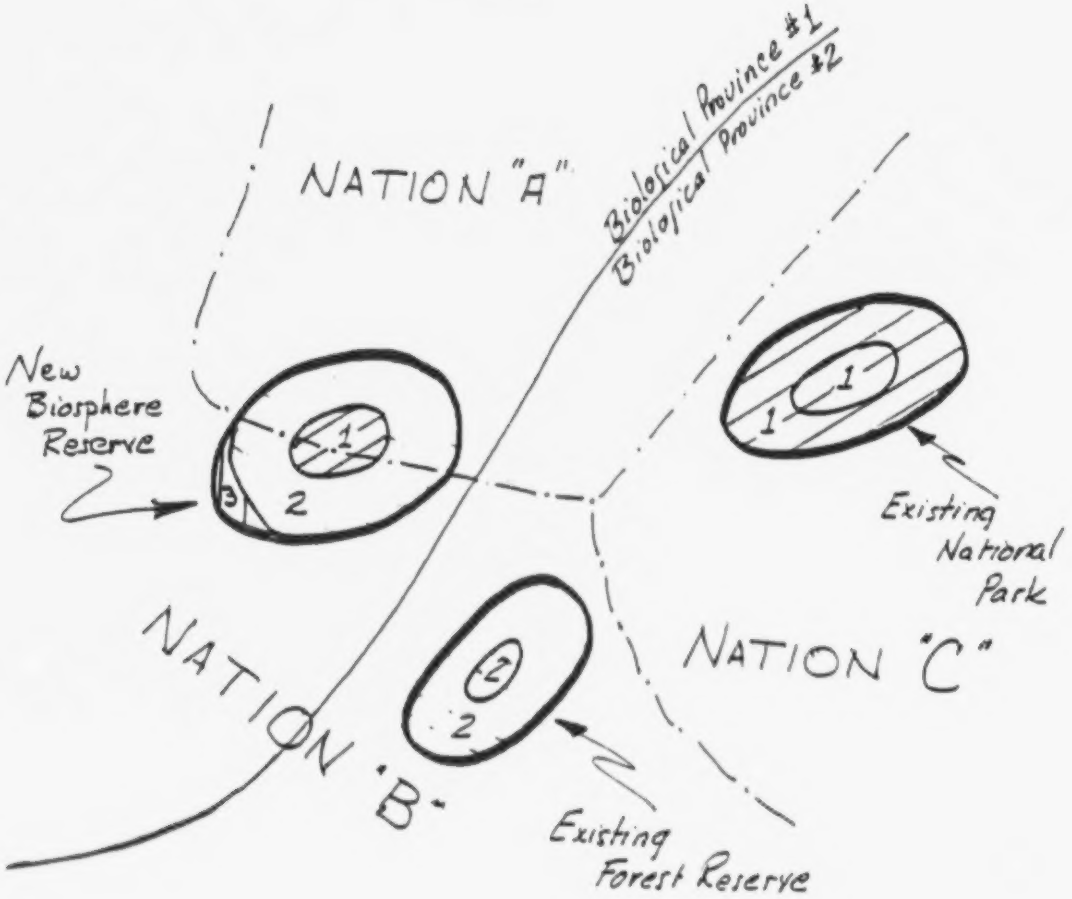
1. Natural Zone
2. Manipulative Zone
3. Restoration Zone
4. Cultural Zone

Figure XI-A-2. A "clustered" Biosphere Reserve can be established where the natural zone is located in a separate conservation area from the manipulative zone. Both conservation areas must lie within the same biological region. Note that in this case both the natural and the manipulative zones have a core and a buffering area to provide a gradient for levels of activities and a protection from adverse external influences.



1. Natural Zone
2. Manipulative Zone
3. Restoration Zone
4. Cultural Zone
5. Temporary Use Zone

Figure XI-A-3. A variation on the clustered Biosphere Reserve shows the large natural and manipulative zones within separate conservation areas. The restoration and cultural zones are also shown to lie in separate areas. Occasionally, additional sites will be required on a temporary basis for particular types of research, education and training activities. Temporary access to local farms, forests, lakes and rivers, etc., will compliment the permanent zones. All zones lie in the same biological region.



1. Natural Zone
2. Manipulative Zone
3. Recovery Zone

Figure XI-A-4. Regional cooperation is encouraged where, in cases such as that issulstrated, two or more biological provinces pass across several nations' boundaries. One cooperative boundary Biosphere Reserve will potentially provide for province No. 1. In the example of province No. 2, an existing National Park in Nation C and an existing Forest Reserve in Nation B can be re-oriented to meet the objectives of the Biosphere Program.

required to provide for the uses associated with the Biosphere Project. In still other cases, actual Biosphere Reserves similar to the idealized description above, will be established. Perhaps new institutions may also be established to manage these new Reserves. In any of these or similar cases, the areas may be considered by UNESCO and other international organizations to be part of the world-wide framework of Biosphere Reserves.

Many existing conservation efforts are playing significant roles at the national and international levels. National Parks, National Forests, Game Reserves, Experiment Stations and various other types of reserves relate to national conservation and development objectives. Several provide the basis for, or are involved in international projects, programs and activities such as the World Conferences on National Parks, the United Nations List of National Parks, the World Directory of National Parks and Protected Areas, the Commission on National Parks and Protected Areas, the World Forestry Congresses, and the International Union of Forestry Research Organizations. These and similar activities provide mechanisms for international cooperation on some uses and some forms of management of wildland reserves. Expanding these types of efforts, the Biosphere Reserve Project has developed a comprehensive and integrated focus which relates man to his environment, and brings scientists together with resource managers and educators.

Figures XI-A-1 through 4 demonstrate that portions of National Parks, National Forests, Game Reserves and Experiment Stations can serve as components of Biosphere Reserves. Figure XI-A-5 demonstrates how a multiple-use management area could conceivably provide all of the zones necessary for a Biosphere Reserve, so long as such an area were to provide for a perpetual natural or scientific zone. On the contrary, as shown in Figure XI-A-6, a National Park cannot normally provide all of the zones necessary for a Biosphere Reserve because there is inconsistency between most types of manipulative research and primary nature conservation objectives.

The many variations of National Reserves, National Forests, Game Reserves as well as Forest Reserves, Nature Reserves, Nature Parks and other protected areas require individual, case-by-case analysis. A general guideline follows from those already stated: to the extent that permanent natural and manipulated zones may be dedicated to the conservation, research, education and training objectives of the Biosphere Reserve Project (observing criteria for minimum size and diversity), such reserves may become Biosphere Reserves or components of Biosphere Reserves. Again, the addition of restoration and cultural zones is important where feasible.

The "Convention Concerning the Protection of the World Cultural and Natural Heritage"[43] provides for the establishment of World Heritage Sites which have three fundamental commitments: (i) to protect, in perpetuity, sites, formations and objects of outstanding international significance; (ii) to make these resources available for educational purposes of world-wide scope; and (iii) to cooperate and share with all signatory nations in the benefits and costs of managing the Sites and in the educational activities. Management zones may be established to provide for scientific, recreational and educational activities. The Site may be large or small in extent in accordance with the particular item to be protected. The Sites will comprise a network of areas and objects which will contain the world's outstanding Heritage of nature and culture.[44]

The objectives and management practices related to the Biosphere Reserve and the World Heritage Sites can be integrated. Similar to the

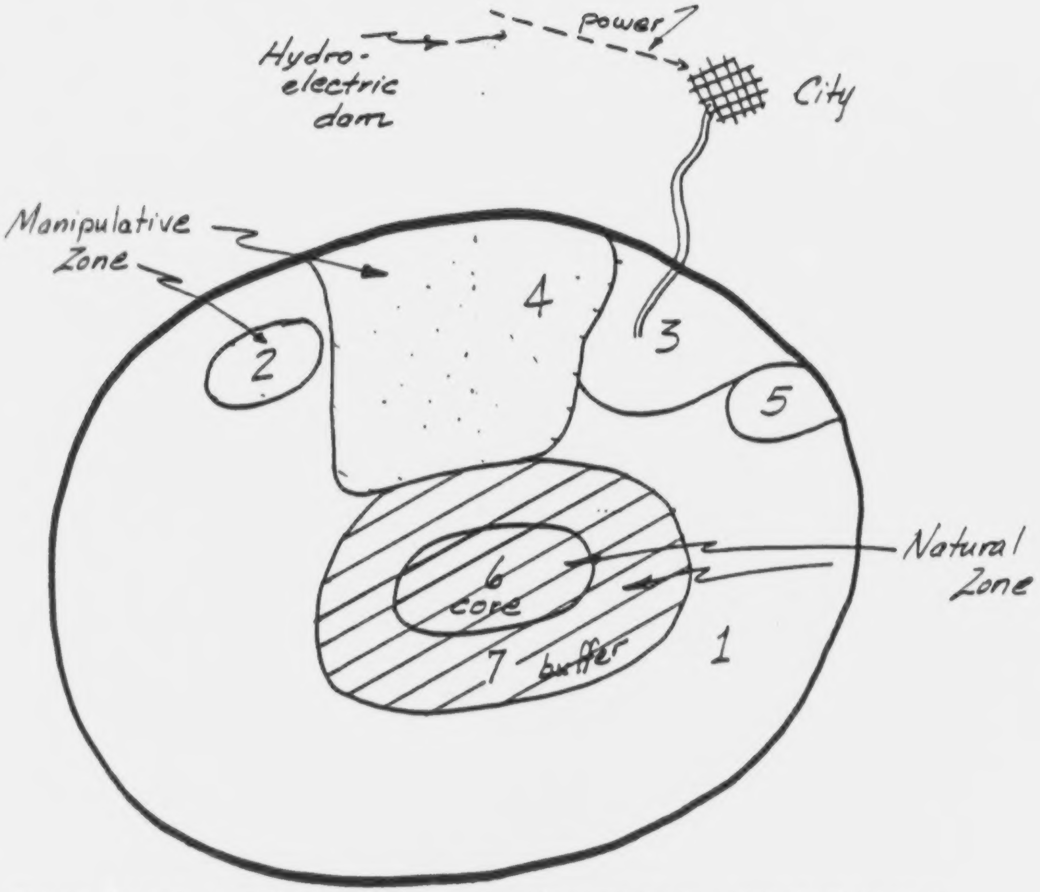


Figure XI-A-5. A multiple-use conservation area can conceptually meet all of the requirements of a Biosphere Reserve by including natural and manipulative zones at integral parts of the management plan.

1. General Production Zone (timber, hunting, fishing, grazing)
2. Wildlife Protection Zone (special species control)
3. Intensive Recreation Zone (recreation and tourism)
4. Watershed Management Zone (water, vegetative manipulation)
5. Special Use (staff housing, administration)
6. Scientific Zone (complete protection for research and baseline)
7. Primitive Zone (extensive recreation, no resource extraction)

All zones contribute to the conservation of genetic materials, water resources, and support rural development.

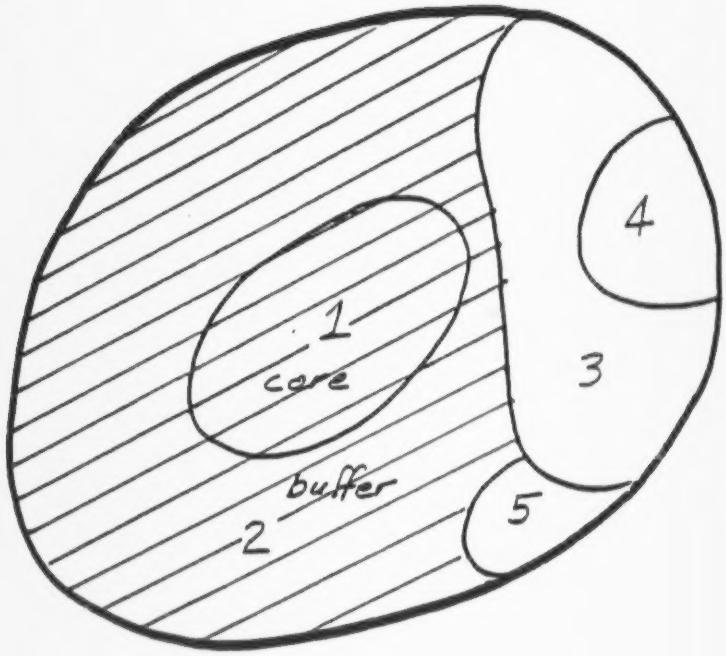


Figure XI-A-6. Generally, the National Park cannot address all of the objectives of the Biosphere Reserve project becasue manipulative research activities normally are inconsistant with the conservation of nature in its natural state (free as possible from external influences and physical development).

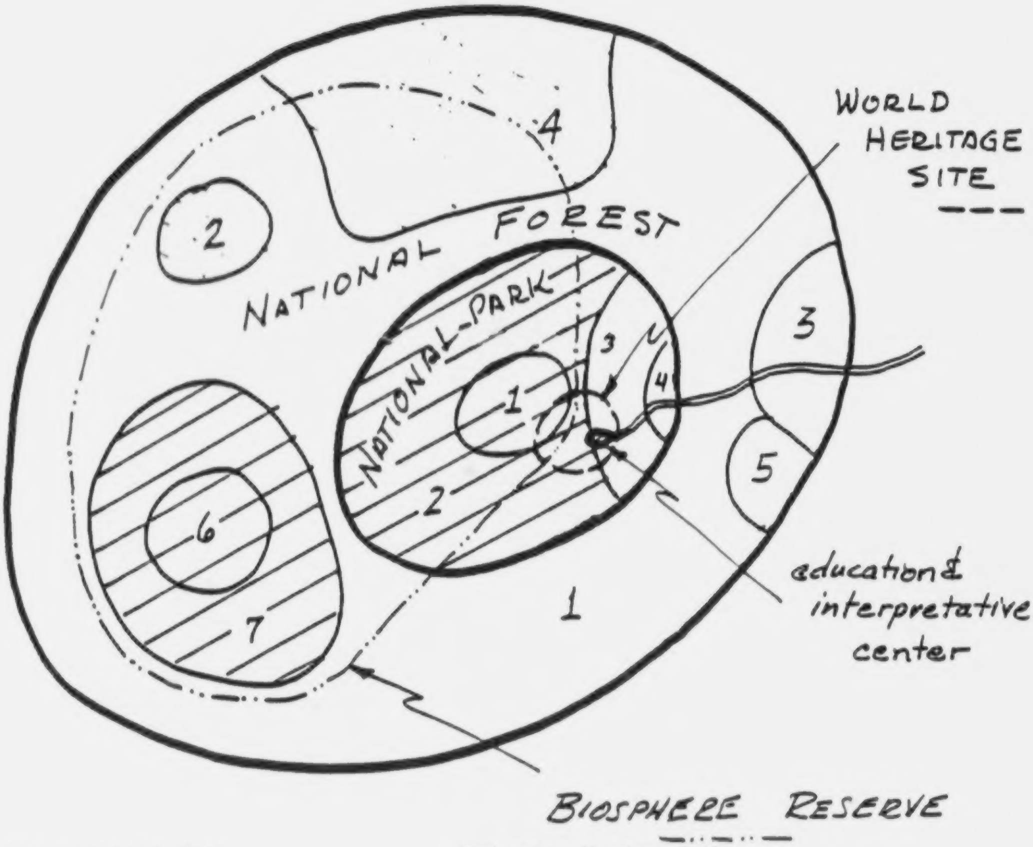
1. Scientific Zone (research, recretation strictly controlled)
2. Primitive Zone (extensive rustic recreation, research)
3. Extensive Use (recreation, extensive developments)
4. Intensive Use (more intensive developments to receive visitors)
5. Special Use (staff housing, administration, etc.)

All zones contribute to the conservation of genetic materials, water resources, and support rural development.

Biosphere Reserve, the World Heritage Site can consist of all or part of an existing National Park, National Monument, National Forest, Game Reserve or similar wildland or cultural area. Or, it may in some cases stand by itself as a new administratively independent designation with its own law, institution, staff and budget. The World Heritage Site, like the Biosphere Reserve, has an important commitment to education, but the theme is related to heritage which in general will be distinct from the scientific inquiry of the Biosphere Reserve. The exception may lie in the realm of cultural areas which may well be of relevance to both the historic value and interpretation of the World Heritage program and to the study of stable landuse systems of the Biosphere Reserve Project. In such event, it is suggested that the national World Heritage and MAB committees coordinate the management and use of the area.

Conceptually, a World Heritage Site can be managed to include a natural and manipulative zone, among others. Likewise, a Biosphere Reserve may have a World Heritage Site as a zone within its boundaries. Figure XI-A-7 demonstrates these alternatives. This approach will be practical to the extent that land management, scientific and educational organizations can achieve pragmatic cooperation.

Thus, it is envisioned that a network of Biosphere Reserves can be developed without competing or detracting from other, on-going or newly developing conservation efforts. On the contrary, through careful analysis of objectives, management practices and administrative structures as suggested above, existing and new areas can be developed to greater efficiency. The gaps in the national protected area system can be identified. New conservation areas can be created and complementary zones added within or around the periphery of existing areas. This comprehensive view of conservation area management can ensure that as many options as possible for research, education and training are maintained in available form for the benefits of all mankind.



Existing National Park

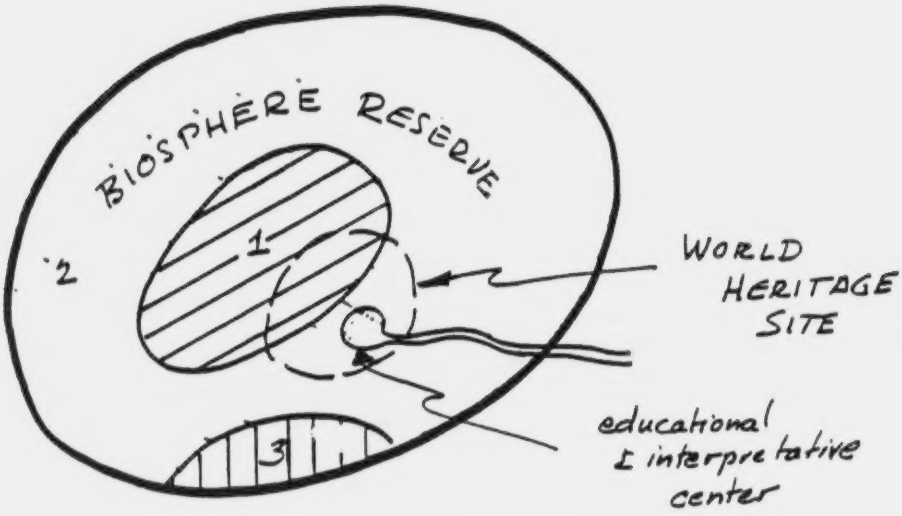
1. Scientific or Intangible Zone
2. Primitive Zone
3. Extensive Use Zone
4. Intensive Use Zone

Existing National Forest

1. General Production Zone
2. Wildlife Protection Zone
3. Intensive Recreation Zone
4. Watershed Management Zone
5. Special Use Zone
6. Scientific Zone
7. Primitive Zone

Figure XI-A-7. Biosphere Reserves and World Heritage Sites realte to each other and to other on-going conservation programmes. To the extent that local organizations can be coordinated, it is possible to integrate resources and personnel so as to address the objectives of the several programmes on an effective basis.

In the first case, a National Park surrounds a National Park. A World Heritage Site has been established to acknowledge the great value of the natural resources in the internor of the Park. A Biosphere Reserve has been established covering the scientific and primitive manipulative areas of the Forest and Park. Note that the same outstanding resource is included within the World Heritage Site and slightly in the Biosphere Reserve. There are no necessary inconsistencies in this apparent "overlap" since the uses are the same.



1. Natural Zone
2. Manipulative Zone
3. Recovery Zone

Figure XI-A-7 continued. Variations on Biosphere Reserves and World Heritage Sites.

In the second case, the World Heritage Site is established within a large Biosphere Reserve.

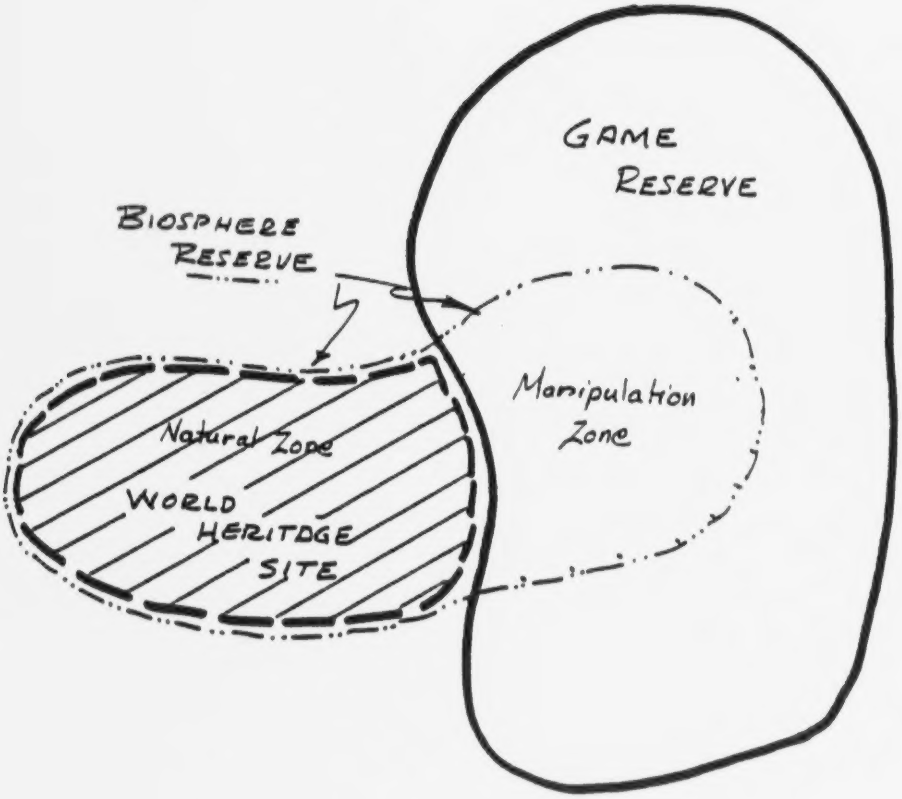


Figure XI-A-7 continued. In the third case, a World Heritage Site is established along side an existing Game Reserve in an area not previously managed for conservation. A new Biosphere Reserve includes the Heritage Site and part of the Game Reserve.

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6. Note especially the resource inventory studies, the Cutibireni National Park proposal in Peru, and the La Plata River Basin, Darien and Pilcomayo studies all of which include park and reserve proposals.

7. The Inter-American Institute of Agricultural Sciences of the OAS (IICA) was originally established at Turrialba, Costa Rica in 1941. IICA later expanded to regional and national offices and programs throughout Latin America and the Caribbean. During this period until 1973, the Turrialba Institute remained the Graduate Education and Research Center of IICA. Following 1973, the Turrialba Institute became the Center for Research and Training in Tropical Agricultural(CATIE), under the sponsorship of IICA and the Government of Costa Rica, with the cooperation of other governments of Central America and the Caribbean.

8a. Primera Reunión del Comité Intergubernamental Técnico para la Protección y Manejo de la Flora y Fauna Amazónicas. Iquitos, Perú, 28 junio-2 julio 1976.

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12. See: Carta de Noticias, Comite Latinoamericano de Parques Nacionales. Secretaría Joaquin V. Gonzalez 448, Buenos Aires, Argentina.

13. In 1975, for example, a roll of Kodachrome transparency film (20 exposure without processing) in the United States sold for between $2.00 and $2.50 per roll. In Quito and Lima it sold for between $8.00 and $10.00. Santiago, Chile, Kodachrome was unavailable.

14. See for example, the FAO/Rockefeller Brothers Fund cooperative project "Trust Fund 199" from 1971-1975. Also, note the many technical meetings, seminars and courses supported by bilateral government "Trust Funds" with IUCN and FAO as implementing institutions.

15. Gregory, G.R. 1972. Forest Resource Economics. The Ronald Press Company, New York. pp. 149, 328-332, and 471.

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19. This refers to horizontal and vertical integration of national parks which was presented in Chapter III.

20. Personal interview with Carlos Ponce del Prado, Director, Dirección de Conservación, Dirección General Forestal y de Fauna, Lima, Peru, 5 March 1975.

21. This inclusion of scholarships for local graduate students has been an element of cooperative research at the Charles Darwin Research Station (Galapagos National Park, Ecuador) for several years.

22. In Costa Rica, the visiting scientists of the Organization for Tropical Studies contributed equipment including a large refrigerator/freezer unit which helped to furnish the research and staff housing facilities in Santa Rosa National Park.

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CHAPTER XII

STRATEGY FOR REGIONAL AND GLOBAL COOPERATION

Introduction

For the management of national parks it is the Nation State which is the basic unit of authority and action. Regional (inter-country) and world bodies have been established to do particular kinds of development and environmental work, but their mandates are given by Nation States.

In contrast, natural resources function within the ecosystem -- a collection of interrelated elements which provides a "home" or oikos for individuals and communities of plants, animals, and of course, man. Ecosystems are not fixed geographic units to be confused with biological provinces or biogeographical regions. They can be described depending upon a point of reference -- the ecosystem of the Southern Right Whale, the jaguar, the anchovy, or the mahagony tree.

To examine any particular species (including man) the system which houses it has little regard for human politics and political frontiers. What this means is that the basic unit for human action is often of a different size or shape than the Nation State. In this instance, one State finds itself with the need to cooperate with other States to work together on a particular ecosystem. A good example is a watershed which is born in the catchment basin of the mountains of country A, passes across the border through the hydroelectric dams and irrigation works of country B, and eventually joins the estuarine fishery and the ocean in country C. So, if country C is concerned about its fishery, it must work with countries A and B to find a solution to river basin problems such as sediment and pollution.

The inevitable need to work with ecosystems is one key reason for cooperation among countries. There are others: were each country to proceed on its own, there would be considerable duplication and overlap in work and investments. For example, each might do research on the same ecological area; each might install a school for training national park guards; one may be considering the establishment of a national park in a biome which is already well represented and managed in the existing park of another. There will be knowledge, skills, data and experience to share. One country will have been managing parks for decades, another will just be starting. One will have a management capacity which will include expertise in fields which another will not have developed as yet.

For a nation, one of the principle objectives of conservation is to establish a network of national parks and protected areas which has representation of each of the nation's biological units (biome, biological province, biogeographical region, etc.). With ecosystems, biomes and other types of units extending across international boundaries, it is obvious that the quality of each nation's park system will be greatly enhanced by the system which its neighbors develop.

This is particularly true if the ultimate goal is to ensure that representative samples of all biological units are managed within protected area, regardless of the Nation State within which they lie.

In the foregoing chapters, the focus has been upon planning individual national parks, park systems and park strategies for the country-level. This is logical because, again, it is the country which is the basic unit of authority and action. However, if a country depends upon a river, ocean current, fishery, wild animal or other resource which is shared with one or more neighboring nations, then from an ecosystem point-of-view, it must work with its neighbors to ensure the adequate management of that resource.

In the same sense that the nations of Latin America are forming mechanisms for cooperation on economic integration and development, regional cooperation is required for natural resource management.

The purpose of this chapter is to propose a strategy for regional cooperation for the management of national parks in Latin America. The suggested strategy is presented in the most straight-forward terms in an attempt to be useful to higher-level officers responsible for international affairs in national governments and international organizations. It opens with a general framework for regional cooperation to establish the premises and logical arguments upon which the strategy will be resting.

Then, the strategy itself is presented in five parts. Starting with the national-level authority and action, the strategy builds upon the capacity of nations to manage their national parks and other conservation units, upon national systems, plans and strategies for parks and other protected areas, and upon the preparation of integrated development plans at the national level in which resource conservation and management is an integral part. The strategy turns to inter-country work focused on problems and resource systems of interest to more than one country. The national and regional-level activities are then tied into the several global-level programs which provide the context for worldwide cooperation on resource management and conservation among nations.

General Framework for Regional Cooperation on National Park Management

Natural and cultural resources found in lands which are generally wild can be managed in a variety of ways to yield a wide array of benefits to mankind. Some of these benefits can only come from areas which are maintained in their natural state. Some require that the resources be somehow manipulated. Most require that the resources are afforded long-run stability.

These benefits include:

1. The management of a network for representative samples of each of the nation's biological areas, in their natural state of perpetual basis.

2. The maintenance of examples of the diversity of the nation's ecosystems, with particular interest in ensuring that its environment is adequately regulated.

3. The assurance that the nation's genetic wealth is adequately maintained.

4. The management of sites and objects of historical and archeological importance to the nation's cultural background.

5. The provision of opportunities for study and research on the natural and cultural resources to promote their understanding and rational use. Support of efforts to educate the general citizenry regarding their resources and to prepare the nation's future scientists, artists and educators. As part of the educational and research interest, the natural and cultural resources can be employed to monitor and compare development activities to the natural pre-development state of nature and earlier cultures.

6. The management of watersheds to ensure the continuous flow of water for a variety of purposes.

7. The assurance that all management and development activities are designed and maintained to minimize erosion, sedimentation, flooding and drought.

8. The management of wild fauna as a resource capable of providing animal protein, hides, furs, trophies, sport hunting, recreational viewing, and other products and services.

9. The management of timber and plant species to ensure the continued, sustained-yield production of wood, pulp and paper, chemical derivities, habitat, watershed control and of the many other goods and services obtained from the forest.

10. The management of forests and other wildlands to supply opportunities for the recreation of the local human population in a physically and emotionally healthy outdoor environment. Where appropriate to national development and policy, recreational developments can be tied with infrastructure in hotels, restaurants, transportation and other services to promote a tourist industry focused upon the natural and cultural heritage of the nation.

11. The protection of high-quality scenic areas for their inspirational and aesthetic values and for the integral backdrop of

cultural monuments, roadways, rivers, villages and cities throughout the nation.

12. The management of large sectors of the national territory with flexible methods which are capable of responding to society's changing requirements and the nation's environmental stability.

13. And, finally, the management of the natural and cultural resources in rural lands where most of the nation's food production, wood, water, waterpower, recreation, and other products and services from the land are produced. These rural lands are also a place of poverty and economic and social injustice. Due to the diverse pressures from these factors, lands are commonly over-exploited, and lands which are ecologically incapable of supporting agriculture or grazing, are often opened and eroded. These marginal lands can be reclaimed.

Experience shows that wildlands capable of producing these types of benefits are appropriately managed as national conservation areas. According to the combination of benefits or objectives to be pursued, and the means required to meet these ends, various categories of conservation areas can be designed and established, including national parks, national forests, wildlife sanctuaries, watershed protection zones, and resource reserves. All of these categories can be managed to yield several benefits simultaneously on a sustained-yield basis.

The benefits described are related to fundamentals of national welfare. Considering the ecological implications of these benefits and the conservation areas required to produce them, these activities are clearly related to the "life support system" of the nation. For these reasons, the management of natural and cultural conservation areas requires the support of laws and policies, a strong and continuous budget, and a well informed and appreciative citizenry. Furthermore, these efforts must be incorporated into the normal activities of the national planning board, to be rated and ranked with hospitals, schools, fire and police departments, courts of law, and the military. Moreover, it is to be recognized that it is these resources which constitute the basis upon which these other activities can function, now and in the future.

While these resources, and the conservation areas needed to manage them can be recognized as vital to national welfare, they are in a precarious position. Wildlands, and especially public wildlands, are "the property of everyone and the responsibility of no one." They are common property, and as such are slowly or rapidly pilfered and depleted. Their integrity requires that all activities which may affect them are well coordinated. And, they must be awarded a status similar to oil reserves and other energy supplies, and other natural and man-made capital. If society is to continue to function, the natural and cultural resources of wildlands will have to be available long after the oil and other non-renewable resources have been exhausted.

Once the management of the nation's wildland natural and cultural resources is viewed in the appropriate perspective of national environmental health and development, they become of strategic importance. The ecosystem becomes a fundamental unit of planning for resource management and development. When dealing with water resources, mountain chains along international borders, forests, archeological and cultural monuments, fisheries, genetic materials, tourism circuits, and other aspects, nations find themselves obliged to cooperate with neighboring states if rational solutions are to be found and implemented.

Regional cooperation in resource management will provide the opportunity to work together on problems of common interest, to economize on the expenditure of scarce resources, and to share data, knowledge, skills and experience. And, such cooperation provides authority and the basis for action to implement coordinated programs in several countries designed to yield a resource management program in the best interest of the participating nations.

Since the Nation State is the basic unit of authority and action, it is appropriate that the individual countries develop the necessary capacity to manage conservation units of national-level interest. It is useful that nations cooperate to develop terminology, nomenclature, methods and techniques to facilitate communications and cooperative efforts in the future. As nations develop the capacity to design and manage networks of conservation units they will become prepared to approach regional-level issues. Similarly, the regional level of analysis sets the stage for consideration of global issues. Each conservation unit is a potential element of global programs of interest to each nation, such as the Man and the Biosphere Programme, the Global Environmental Monitoring System, the world network of National Parks, and the World Heritage Convention.

From a Latin American regional perspective, the Western Hemisphere Convention for the Protection of Natural and Natural Resources provides an instrument which binds the nations of the hemisphere together by their common interests in ecosystem management.

The Strategy

This strategy for regional and global cooperation assumes that the preceding General Framework has been clearly understood and supported. It is assumed that national governments are committed to search for a form of development which provides for long-run harmony between the goals and means of economic and social development and the constraints and capacity of the biosphere. This ecodevelopment was articulated in Chapter I. It is also assumed that national governments are committed to inter-country cooperation where necessary to maintain environmental health and the natural and cultural treasures of all people.

As with the methods for planning and management suggested in previous chapters, a procedure is presented in the form of steps and sub-steps. And as before, the steps are inter-dependent and can be implemented simultaneously.

1. Build the capacity of the national-level natural resource, forestry or park department to manage national parks. The fundamental entity of wildland management is the conservation unit -- such as the national park, national forest, wildlife sanctuary, watershed protection zone or resource reserve. It is in these areas where action takes place to ensure that natural or cultural resources are protected and that their productive capacity is maintained or enhanced. National parks and other types of conservation units are places where men add their intelligence and muscle to natural and man-made capital and technology to try and produce the benefits suggested in the General Framework. Primary emphasis will be given to national parks, but similar strategic guidelines apply to other types of wildland conservation areas.

The success of regional and global-level programs for the conservation of natural and cultural resources can only be as great as that permitted by the capacities of each country to manage its respective conservation units. Where the capacities of national programs to manage national parks are weak, regional and global conservation efforts can be expected to accomplish little in practical terms. Where national parks are under strong management, they act as the building blocks for inter-country cooperation. Moreover, it can work both ways since inter-country cooperation can support the development and managerial capacity of individual countries through the sharing of experience and technology.

Five specific guidelines are suggested to accomplish the first step of the strategy:

a) Make written plans for the management and development of individual national parks. To ensure that the nation's wildland resources which are critical to conservation and development are appropriately managed, man's activities and investments in those areas must be carefully planned. In Chapter V, methods and techniques were suggested for planning individual national parks. These planning methods and techniques have been developed and tested in Latin America and elsewhere. The written plan provides a tool to guide park management and development, to communicate the plan to other government departments and related organizations and individuals, and to measure the results of management efforts. Only with written plans can learning from experience become objective, and thereby, can management capacity become appropriately developed.

b) Train personnel and initiate a career development process. The scarcest of all resources for wildland management is personnel with the capacity to make decisions, articulate and implement plans and to learn from past experience. Workshops and field planning exercises are useful methods for training personnel in planning and management methods. They are also useful for identifying and cultivating individuals with promise for leadership and decision-making positions. In addition, seminars, university and post-graduate degree programs and study tours are important training methods. All personnel should be given the opportunity to expand their individual capacities. Each member of the park department can be expected to support fully the goals of national parks only if he or she has been trained in the appropriate concepts, principles, methods and techniques. Ultimately, procedures are required which promote to higher responsibilities those individuals possessing management capacity and field experience. A career ladder offers an incentive to all personnel to study and gain experience in order to seek more rewarding employment. For the nation, the career system for national park personnel helps develop the capacity to manage critical natural and cultural resources.

c) Promote the formation of professional fields upon which park management depends. Some fields which are critical to the planning, management and development of national parks and other conservation units, are barely established in many countries. These include landscape architecture, environmental law, interpretation of natural and cultural history, ecology, museum design and maintenance engineering. While not necessarily members of the park department staff, individuals in these professions are needed to assist the full development of conservation units. Through planning exercises involving participants from other government departments and the local university, those professions which are lacking can be identified. The park department, together with the government council of science and technology and the university can choose to strengthen existing or develop new faculties to prepare individuals in these progressions. Alternatively, or perhaps as an interim measure, arrangements can be made to receive consultants from elsewhere and send promising and motivated nationals to foreign universities.

d) Organize the park department to work towards the objectives of conservation and development. Several factors are important. Central offices and field units must have effective and open channels of communications. The parks department must be appropriately connected with other relevant departments of government and other institutions. A structure and hierarchy is required which provides for career development, team work and interdisciplinary planning, and a clear line of authority extending from the executive branch of government, through the director of the park department and on to the area managers. Employees are to be trained and provided with opportunities to participate in planning the management and development of their respective units. Ultimately, the feedback from employee participation will provide guidelines for improving the management of parks based upon actual local experience.

e) Institutionalize the management of national parks. To meet commitments for conservation and development, the management of national parks must become an integral part of national institutions. Maintaining representative areas of the nation's ecosystems in a natural state for perpetuity requires that a management capacity be established and developed which will be around for perpetuity. The park department needs to work closely with national and regional planning offices and through them with other land management and development programs and projects.

The park department must become a key government office in charge of the nation's critical natural (and perhaps cultural) heritage resources upon which much of the national productivity depends. The park department requires an appropriate budget for operating, maintenance, development, salaries, equipment and supplies, training and scholarships. Sufficient positions must be established to manage areas of critical importance to the nation's development and conservation. Ultimately, a park department must be a strong and viable part of the government dedicated to the maintenance of social and environmental health.

Strategically, in building the capacity to manage individual national parks, the park department must demonstrate its capability to accept the mandate of custodianship for the nation's natural and cultural treasure. The park department must demonstrate that services of importance to national environmental conservation and development can be provided now and demonstrate that they can also be available for the perpetual future. And, it must develop the confidence and trust within government and the public that a professional public department is in charge.

2. Prepare plans for systems of national parks and a national strategy to implement the park system. A network of national parks is required to meet the objectives of conservation and development. With one or more conservation unit(s) planned and being implemented, the next step for the park department is to prepare a plan for the system of national parks to cover the breadth of the national territory.

The park system plan will show where each of the several parks are to be located and explain how each relates to the various objectives. The following step involves the design of a national strategy for establishing, managing and developing the system of parks. The critical question is to determine the priority at which each area is to be addressed. Furthermore, individual management activities within and among the areas will require attention according to the anticipated problems and challenges on the one hand, and according to the limitations posed by the supply of trained manpower, budget, supplies and equipment, on the other.

Three specific guidelines are suggested to accomplish the second step of the strategy for regional and global cooperation:

a) Prepare a plan for a system of national parks. Each conservation objective provides the basis to make a review of the requirements for national parks. The system will need to include representative samples of the country's major biomes, biological provinces or ecosystems. The ecological diversity of the nation is to be preserved. A network of research and educational facilities can be established with the same natural areas. The parks can be designed and located to provide selected recreational and touristic services. Watersheds, genetic resources and critical habitats can be protected as part of each national park to assure environmental stability. Chapter VI elaborated methods for planning park systems based primarily upon experience in Latin America. Several examples were given to demonstrate suggested procedures.

A workshop for park personnel can be given to explain systems planning procedures. It is an opportunity to promote the participation of departmental personnel in searching for and suggesting sites as candidates for the system.

Planning the individual national park is an excellent mechanism to learn about park management; planning a park system is a means to grasp the role of national parks in the conservation and development of a nation.

b) Study priorities and prepare a national strategy to implement the park system. While some areas are located in parts of the country which are unsettled and which witness little if any pressure for the land, other areas are experiencing colonization, deforestation, burning and other changes in land use. Some of these changes are disruptive and damaging to the long-run biological capacity of the areas. Some areas are unique, the last of a kind; others are critical habitats for important species; some are near to urban centers with demands for outdoor recreation; some provide excellent opportunities for research and educational activities; others cover watersheds and streams with contribution directly into irrigation or hydroelectric projects downstream, below the park. These and other factors place some parks in a position of extreme urgency, that is, unless something is done immediately to establish and manage the area appropriately, the natural and cultural resources will be lost and the expected benefits will be forfeited. Other areas need not receive urgent attention: that is, if little or nothing is done by the park department today these areas will remain available to be established as parks for many years and their potential benefits will be available in the future.

On the other side of the coin are considerations of resources available to the department to do the work. Depending upon the availability of manpower, budget, supplies and equipment the department will be able to do only a limited amount of work each year. Generally, the most limiting factor is managerial capacity, that is, to make park plans, to schedule the work activities, to initiate implementation and to inspect and evaluate the work.

If the constraints upon the department prevent it from establishing the national park system, three options may be explored. Either training, maintenance, and improved administration are required to raise the efficiency of the men and material already on the job, or additional positions for personnel and additional equipment are needed, or both. Each input for the park department can be examined and a budget prepared including standard items of manpower, operations, maintenance, capital development, vehicles, equipment and supplies, training courses, scholarships, study trips, etc. Each input can be directly related to an activity in the systems plan. The national strategy then states that particular activities will require particular expenditures in a certain order. Pragmatically, if the expenditure is not made, a management activity will not be implemented, and particular benefits will not become available.

Chapter VII suggests a method of preparing a set of priorities for implementing the national system of parks. While experience in strategy planning is relatively limited, several examples are given from Latin America.

c) Prepare a national-level monitoring system. A critical problem of both ecological and economic significance to the nation is the irreversible alteration of natural areas or cultural sites prior to the determination of their significance. Furthermore, it is common to find portions of large or remote parks being altered under the influence of adjacent land uses. What is required is a monitoring mechanism whereby information on such critical problems is passed urgently to levels of decision making for action. It is necessary to observe and inspect all units of the national park system on a periodic basis. The remote pre-implementation areas may require only an occasional visit by airplane or foot. More accessible areas will require more frequent inspection. Parks already in operation can be monitored as a normal part of daily management activities by park personnel. Critical is that all personnel understand the problem and what to look for.

Contingency plans must be ready to deal with the various kinds of problems which are anticipated. A park which was to remain un-implemented for several years may become challenged by rapidly developing adjacent land uses. This immediately affects the national park system plan and the national strategy. If attention is shifted to this site, then some attention must necessarily be taken from other sites. Alternatively, if the government values the benefits to be sacrificed, then another alternative is to add emergency resources to the park department to enable it to attend to the new urgent situation without abandoning the ongoing program.

The preparation of a national park system plan, a national strategy and a national park monitoring system provides the mechanism by which parks can be connected in pragmatic terms to national ecodevelopment. They provide the means to analyze which benefits arise in response to which investments. They help pinpoint which natural and cultural areas must be managed to ensure which benefits. This establishes the basis for more rigorous economic and ecological analysis in the future. And, it greatly removes ignorance from evaluation. Although there remain many unknown factors in wildland management, it becomes difficult for a government to sacrifice critical natural and cultural resources without at least a warning of their significance to national economy and environment preparation of these three plans puts the parks department on the offensive. These plans articulate the mandate which has been given to the department and explain its full meaning. At this point, there can be no doubt about the scale of the operation necessary to implement ecodevelopment.

3. Integrate the national park, park system and strategy plans into the national development planning process. In the first two steps, the park department will have made the necessary preparations to deal with national development procedures. The department is ready to understand the mechanism by which national development plans are made. Similarly, the planning office must understand the mechanism by which conservation activities critical to national development are implemented. The benefits from wildland management are relevant to national development. The costs of wildland management must be included in the national budget.

The many ties between the conservation areas and other development activities must be made. The park department can greatly support national development by cooperating with other government agencies to ensure the smooth and efficient development of transportation, housing, electrification, food production, timber, fisheries, communications, and human settlements.

Once having gained a realistic overview of the nation and how it functions, the park department, in cooperation with the national science and technology council and the university, will be prepared to consider the problems of common interest with neighboring countries along the international boundaries, and subsequently, the regional and global programs in environmental conservation.

Three guidelines are suggested:

a) Develop an understanding of national planning procedures. Once the park department has a clear understanding of how national parks function and the role of national parks in the conservation and development of the country, the department should become informed on the methods and procedures by which national development plans are made. The planning office can provide training and seminars for personnel from the park department allowing sufficient time to explore the ways in which national parks fit into the process.

b) Bring technical and professional criteria to bear on issues related to natural and cultural resources. The park department has a mandate to fulfill. It is a novice relative to other government sectors involved in national development planning. Generally national parks have been considered under agriculture as a sub-element of forestry. With the greatly broadened perspective expressed in the general framework above, obviously national parks reach into virtually all other traditional sectors. While national parks can efficiently and appropriately be administered together with forestry and other renewable natural resources, parks demonstrate the confusion common to natural resource management. For example, under an ecodevelopment focus, the resources of parks are managed and developed to support food, energy, housing, education, rural development, culture, recreation, and employment.

Parks support the development of science and technology, and maintain options for the nation's future technological development as it relates to natural and cultural resources.

The park department, as part of natural resources and forestry institutions, must join the well established sectors with the humility of a new arrival, yet not hesitate to supply technical criteria on decisions related to natural and cultural resources. In particular terms, it represents the ecological concerns of the nation and must ensure that the "eco" is placed securely into the "development."

c) Convert park, system and strategy plans into terms relevant to national planning. The park, system and strategy plans must be in written form. Generally, national planning procedures have not been designed to incorporate ecological considerations nor land use mechanisms such as national parks which apply ecological principles to development. The park department will need to take the leadership role to transpose the park plans into terms meaningful to the planning office and personnel of other ministries. Specifically, the plans need to be presented in terms of resource systems such as watersheds, coastal lands, estuaries, tropical rain forests, mountain lands, areas in desertification or accelerated erosion. Then the suggested management activities must be explained in terms of the benefits expected and the itemized costs and investments required.

Critical in this guideline is the need for the park department to convince the other government ministries and departments that national parks are management areas. Ultimately, the education sector will identify with parks as elements of the nation's educational system. Engineers will realize that parks are "water producing and conserving areas," and will ask if a park or other type of protected area can be established in relation to each major water project. Universities will view parks as outdoor laboratories. Recreationists and tourists will realize that parks are not simply beautiful outdoor playgrounds but areas of strategic importance to national welfare, and for that reason, they will accept that their activities will necessarily be restricted.

By integrating park, system and strategy plans into the national planning process, the park department demonstrates the willingness, interest and capability to participate in overall national development. Through the process the department gains a perspective of the real world in terms of the complexity of national planning. And, the park department gains access to the decisions on rural development and the allocation of wildland resources.

4. Cooperate with neighboring countries on problems of common interest. An examination of the natural and cultural resource systems of the nation will generally reveal areas where watersheds, estuaries, cultural monuments and forest formations do not follow political boundaries. The issue is clear. Does what happens to the resource on the other side of the border affect the national interests?

Three guidelines are suggested:

a) Identify the areas or issues of common inter-country interest. There are the obvious negative interrelations such as water pollution in one country affecting food production in the neighboring country. Sediment from the land use of one is deposited in the reservoirs of another. The fires of one pass to the other. The tourism of one spend most of their foreign exchange in the neighbor's hotels. The wildlife species protected by one are hunted in the other.

There are many positive interrelations to explore. As each nation seeks to establish a network of national parks to protect representative samples of its ecosystems, outstanding ecological areas will probably be found along borders. There are cases where both countries need not run the expense of each managing a site in the same ecosystem. There are resources which are directly shared. The waters from a shared watershed can be planned to provide more equitable protection and use. Tourism facilities can be located and designed to spread investments; management costs and benefits can be spread among the participating countries through regional tourism planning. Common heritage resource such as genetic materials, scenery, cultural sites or historic battle fields can be planned to ensure access to the citizens of the participating countries. And resources such as scenery, landforms, historic sites, and watersheds which are of common value can be cooperatively studied and monitored, and each participating country can interpret the resources for educational purposes in its respective national parks.

b) Establish "boundary national parks" for the management of wildland resources of common interest. In cases where wildland resources are to be found on both sides of international boundaries and where there is common interest, each country can establish a national park on its respective side of the border. While the sovereignty remains clearly national, both parks can be planned using similar nomenclature, planning methods, zoning designations and a cooperative development scheme.

There are many benefits to be derived from border parks in addition to the managerial advantages. Tourists can visit a larger and more adequately planned area to enjoy the resource. Research and education can cover a larger and often more varied sample of the ecosystem. The costs of monitoring can be shared by two government departments.

A benefit often not discussed but of relevance to many countries is the advantage of having selected portions of international boundaries kept under strict control and in a wild state. This, from the viewpoint of national defense, can be of critical importance along areas of border dispute.

The final benefit to be mentioned is the establishment of a political mechanism of international cooperation. Parks know little politics. They present benefits of interest and value to all men. Their management requires the analysis and evaluation of many difficult issues related to economic and social equity; who gets what, and who pays what? But, parks are one sure activity which neighboring governments can support and which are all but guaranteed to remain free of political inconveniences. They form symbols of international peace, Latin American fraternalism and brotherhood. These values come as the result of relatively inexpensive efforts which bring benefits to thousands of citizens of both nations. Border parks are efficient means to establish and maintain direct peaceful relations between countries.

c) Establish inter-country institutions to analyze, evaluate, plan and monitor activities of common interest. Many resources range beyond two bordering countries. Some river basins interrelate five and six nations. Cultural monuments and historical heritage run common to even larger groupings. Tourism circuits are being developed to link cultural sites and to explore the diversity of the continent. Efforts to protect and manage wildlife species require the cooperation of many nations where illegal movement and activity have to be controlled.

Inter-country institutions can be established to examine specific resources and to recommend coordinated action by the interested governments. Such commissions can relate specifically to national park departments or can involve the planning offices, cultural agencies, tourism offices and other bodies as ppropriate according to the nature of the resources. They can design and implement common programs for research, law, policy, education, tourism, and development priorities.

In political terms, the establishment of a commission acknowledges the importance which each government assigns to the problem but allows national sovereignty and strict independence to be maintained. Each representative may carry the criteria and opinion of his or her respective government to the meeting, and return with suggestions from the group which the home government may wish to consider. Ideally, however, the representatives can also meet as technical and professional officers with the freedom to explore the options for action. In this case, they can discuss the alternatives openly and attempt to influence any of the governments to take action which is more appropriate for the common conservation and development of the group of nations.

Recommendations and suggestions made by inter-governmental commissions can be elevated to the ministerial level and form the subject for meetings of ministers of agriculture, interior or foreign relations. Subsequently, when warranted, recommendations can be reformulated into national laws, inter-country projects and long-term programs with permanent coordinating secretariat bodies. Generally, it is sufficient to have the heads of park departments in close coordination with heads of planning and the ministries of foreign affairs meet periodically and analyze, evaluate, plan and monitor activities of common interest.

5. Participate in global environmental programs. There are United Nations organizations, regional organizations and non-governmental bodies which operate global environmental programs. Those relevant and most important to Latin America have been reviewed in Chapter XI. On reading the basic documents for each program there appears to be a redundancy and inconsistency among them. They have been written at different times, in different circumstances, with different concerns and attitudes in mind. These negative aspects could be discussed; but most important is to explore the positive elements.

Strategically, each country can develop ties with global programs to enable it to relate to countries and peoples throughout the world. For international efforts to be useful, however, the individual nations should first be well acquainted with their own resources, have instrumented their own resource management in practical terms, and have an idea concerning the types of international cooperation which will develop and enhance their own interests.

If there is further need, participation in global programs can be justified as a contribution towards international cooperation on matters of common interest. Each country will be interested or able to work with the various programs in different ways. While some nations have vast unsettled wildlands, others feature high human densities throughout the national territory. While some have cultural and historical shrines of regional or world significance, others may only have sites of local interest. Some have a history and tradition of national parks or other types of wildland management; others have only recently begun park programs and may therefore feel greater flexibility to make changes in nomenclature and the means of management.

Three specific guidelines are suggested:

a) Review each global program to compare objectives and means with existing national and regional programs. Is the global program based upon a new concept, or does it strive to accomplish what the country already has well advanced? Is it simply a new name for the same means and ends to management, or is it a new concept? Perhaps this country is already doing what the program suggests, but it is realized that many other countries have yet to begin. Perhaps it is important to join the program to demonstrate solidarity with the concepts and to help other countries even though it may seem to be nothing new.

b) Participate in global programs to contribute as appropriate. For all countries of the Americas, it is normal that the national interest includes inter-American cooperation as expressed in the Charter of the Organization of American States. The national policies of most nations of the region adhere to the Charter of the United Nations and its various agencies.

For similar reasons, it is suggested that each country relate to each of the major global environmental programs. The manner in which the relationship is developed and the depth to which it proceeds, however, should logically vary with the interests of each individual country.

To adhere fully to some programs may suggest that the names of some conservation units be changed. Other existing conservation areas may appear to need a realignment of goals or means. In many cases these changes would create redundancies in countries which can little afford to establish two different systems of protected natural areas. In most cases, as was demonstrated in Chapter XI and in Appendix A to that chapter, existing and established wildland management practices such as the national park, national forest, wildlife sanctuary and other categories, can be modified to incorporate the new and creative elements of the global environmental conservation programs. Redundancies can be avoided, and useful institutions and traditions need not be inadvertently lost or destroyed.

c) *Specifically, it is suggested that each nation consider its role in the following activities to ensure that it enjoys adequate participation in global environmental programs.* Details on each program have been provided in Chapter XI and will not be repeated.

. *Global Environmental Monitoring System* and *Environmental Monitoring Stations* of different types (UNEP)
. *The Man and the Biosphere Program* and *The World Network of Biosphere Reserves* (Unesco)
. *Western Hemisphere Convention* (OAS)
. *World Convention on Trade in Endangered Species* (IUCN)
. *World Heritage Convention and World Heritage Sites* (Unesco)

Furthermore, it is suggested that each park department attain membership with the *International Union for Conservation of Nature and Natural Resources*. Relations should be established and maintained with IUCN's *Commission on National Parks and Protected Areas* as well as with its commissions on species survival, landscape planning, education, environmental law and policy, and ecology, and its marine conservation program.

The technical and professional aspects of park management can be developed and coordinated through participation in the *National Parks and Wildlife Working Party* of the *Latin American Forest Commission* of the FAO, the IUCN and its various bodies, and through the *Latin American Committee on National Parks* (CLAPN). And the national offices of natural and cultural resources should subscribe and contribute materials to *PARKS* magazine.

As a final suggestion towards regional and global cooperation, each park department is urged to work closely with regional organizations and integration bodies, the various development banks and the Latin American Economic and Social Commission of the UN (CEPAL) to keep them informed of activities and accomplishments on conservation and development. More important is to influence them to orient their policies and activities to accept and support national parks and other protected areas as valuable tools for realistic ecodevelopment.

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